

**KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI**

**APPROPRIATE INCENTIVES FOR THE USE OF HEALTH TECHNOLOGY
ASSESSMENT IN HEALTH CARE –DECISION MAKING IN THE KUMASI
METROPOLIS.**

**BY
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PLANNING AND MANAGEMENT**

June, 2019

DECLARATION

“I declare that I have wholly undertaken this study reported therein under the supervision of Dr. Peter Agyei-Baffour and that except portions where references have been duly cited, this dissertation is the outcome of my research”.

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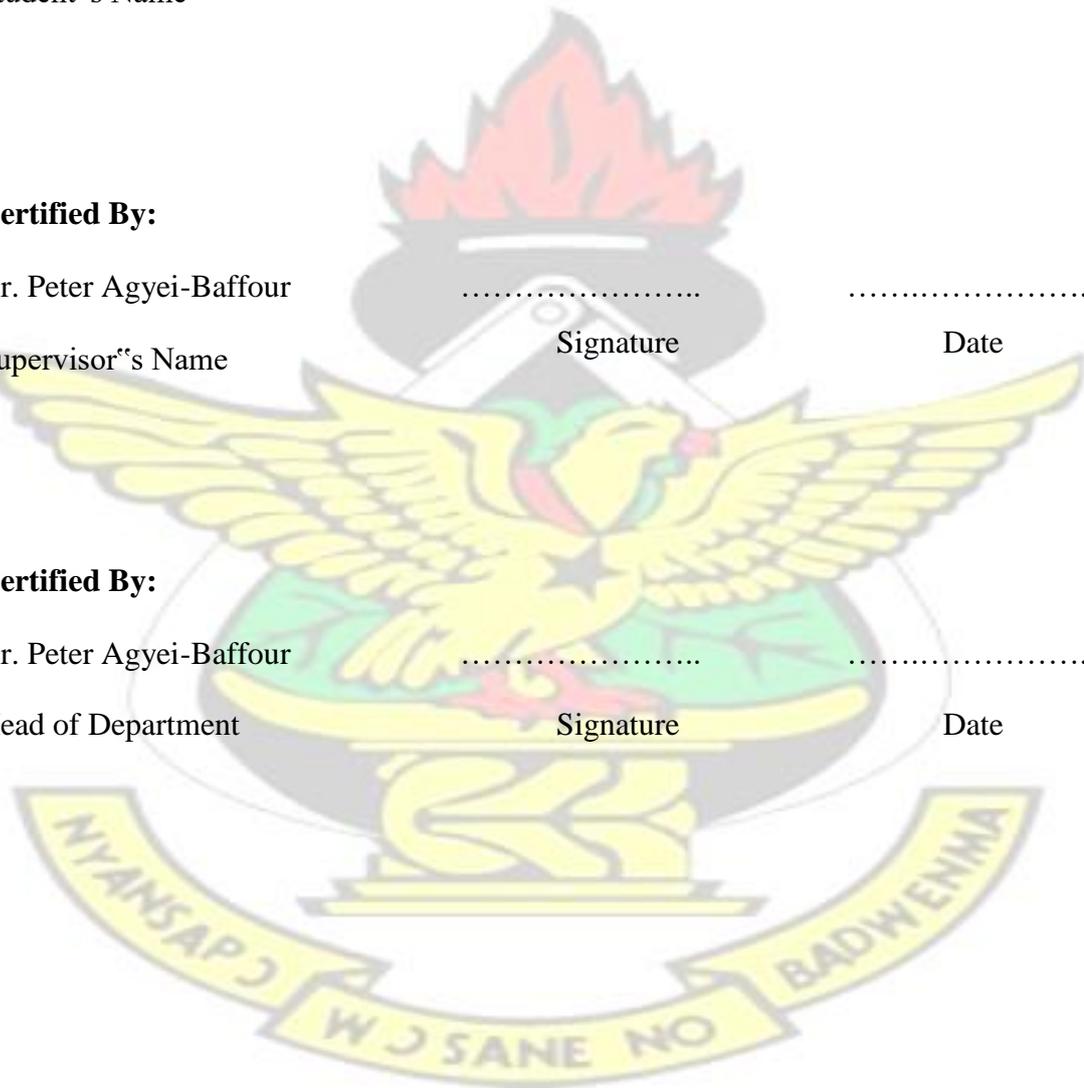
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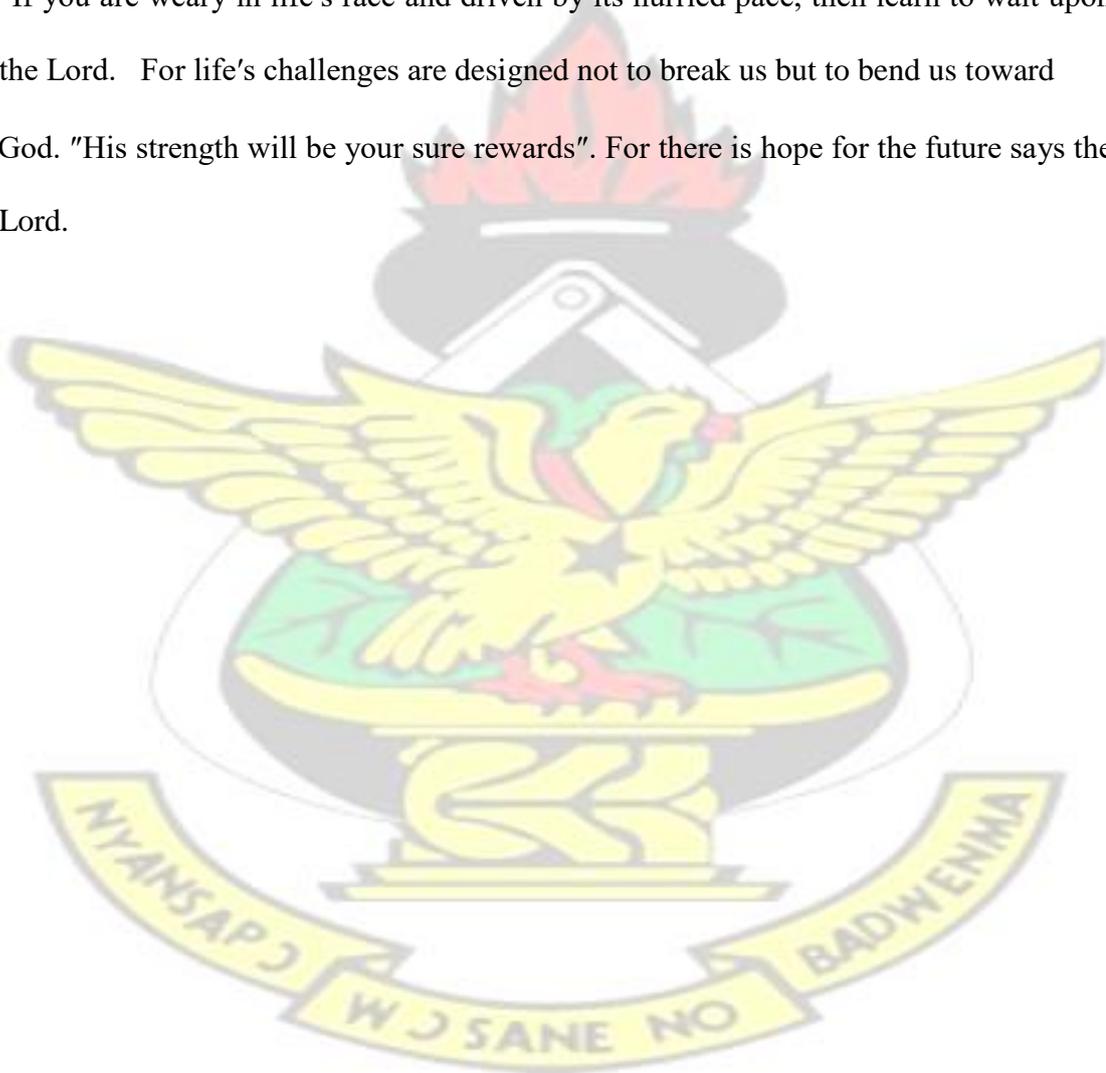
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DEDICATION

To my beloved wife and children for their love and continuous support, without whom I would not have come this far. Next dedication goes to my Dad, Mr. Eric Osei for his support and fatherly care and to all my siblings. Special dedications go to, Mr. Kofi Aniboe Brenya my father -in-law whose encouragement and investment has brought me this far and also all those who contributed in diverse ways towards bringing me this far.

“If you are weary in life’s race and driven by its hurried pace, then learn to wait upon the Lord. For life’s challenges are designed not to break us but to bend us toward God. “His strength will be your sure rewards”. For there is hope for the future says the Lord.



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ABSTRACT

The call for optimization of resources has been reinforced by the WHO's efforts at encouraging the use of health technology assessment to inform public policies, establishment of an institutional framework for decision-making based on health technology assessment, strengthening human resource capabilities, promotion of the production of evidence and dissemination of information and rational use of health technologies. Countries are at different levels of conceptualization and incorporation of HTA in health care decision making. The study therefore examined the incentives and disincentives for the usage or non-usage of health technology assessment in making decisions in the healthcare decision in the Kumasi metropolis. An exploratory study design with mixed method of data collection with 107 health staff was conducted. Quantitative data was analysed at univariate, bivariate and multivariate levels. Logistic regression was run to assess the strengths of selected variables on the dependent variables. The qualitative data was analysed using thematic content analysis. The result showed that there is no existing policy on HTA guiding health care decision making in Ghana. The absence of HTA policy is partly attributed to the low level of capacity in terms of knowledge training and skill development in HTA. Most health decisions are made with inputs from effectiveness, cost-benefits, efficacy and safety of technologies in making decisions studies. The decision making process is largely bottom-up approach. The decision making process is initiated by patients or users of the facility, and hence form the basis as inputs for central management decisions. The decisions of the facilities are made in line with the strategic plans of the health facility, the procurement act and the procurement plans for the year. The decision making process are perceived to result in high effect on patient recovery time, patient survival, deliveries, reduction in errors and quick delivery of services to clients. The areas in the health facilities that HTA related decisions are occasionally and accidentally used include drugs, biologics, devices, equipment supplies and medical surgical procedures. The incentives for using HTA in health care decision making were value for money, quality of life, price, emerging pathogens, avoidance of malpractice, financial incentives and provider competition. The rest were public demand, the provision in the procurement law, efficient use of government funds, effectiveness of health treatment, transparency, and improvement in patient care, sustainability and environmental friendliness. The perceived disincentives for HTA policy in health care decision making in Ghana include inadequate expertise, internal politics, ignorance, lack of funds, complex administrative charges, lack of official strategic plan, unavailability of information and lack of proper structure. The study recommends development of HTA policy capacity building to facilitate its incorporation in healthcare decision making in Ghana.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACRONYM	MEANING
BMCs	Budget and Management Centres
CBA	Cost-Benefit Analysis
CEA	Cost-Effectiveness Analysis
HER	Electronic Health Records
EPN	Ecumenical Pharmaceutical Network
FDA	Food and Drug Administration
GHS	Ghana Health Service
HRDM	Human Resource Development and Management
HT	Health Technology
HTA	Health technology assessment
IARC	International Agency for Cancer Research
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
KATH	Komfo Anokye Teaching Hospital
KBTH MCHH	Korle Bu Teaching Hospital Maternal and Child Health Hospital
MOH	Ministry of Health
NAE	National Academy of Engineering
NCQA	National Committee for Quality Assurance
NHIA	National Health Insurance Authority
NHIS	National Health Insurance Scheme
NICE	National Institute for Health and Clinical Excellence
NOGs	NGOs – Non-Governmental Organisations
PET	Positron-emission Tomography
PPME	Policy, Planning, Monitoring and Evaluation
PS	Procurement and Supplies
R&D	Research and Development
RCT	Randomized Controlled Trials
RSIM	Research, Statistics and Information Management
SSA	Sub-Saharan African
TA	Technology Assessment
TAM	Traditional and Alternative Medicine
UK	United Kingdom
US	United States
USA	United States of America

WHO

World Health Organization

KNUST



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The remarkable development in healthcare in the past three decades has been achieved through technological innovations (Chalkidou, Levine & Dillon, 2010). Breakthroughs in areas such as surgical techniques, wound care, diagnostic imaging, antivirals, molecular diagnostics, biotechnology, organ and tissue replacement, and computer technology in the past years have aided healthcare delivery improvement and health outcomes of patients (Kularatna *et al.*, 2013). However, the rapidly burgeoning expenditure on healthcare is a growing concern for governments and healthcare providers around the world (Doyle & Haran, 2000). The countries worldwide are therefore using a variety of approaches in an attempt to keep pace with modern health technologies while ensuring access to affordable healthcare for patients (Turkson, 2009). Indeed, healthcare stands to benefit from technological innovation and the constant developments in health sciences in general and particularly medical science. However, not every technological development results in net health benefits. There have been several historical counts of technologies in medicine and health that did not necessarily result in the expected benefits or at worse produced harmful outcomes. Healthcare systems throughout the world are confronted with similar health technological challenges. It is thus imperative to ensure proper evaluation and efficacious application of healthcare technologies. Thus, there is the need for the optimization of healthcare benefits with the available resources through the promotion of more effective technologies in considerable societal, ethical and organisational matters. The suboptimal usage of health not only affects patient care, but also the efficiency of the healthcare system (Fronsdal *et al.*, 2010).

Technology can still be managed in ways that improve patient access and health outcomes, while continuing to encourage innovation. There is available evidence to indicate that higher level of financial expenditure in healthcare is not necessarily associated with relatively better health outcomes (Bingefors, 2003). Japan's experience shows that the longest life expectancy does not come with the highest per capita health expenditures. Japan spent 64% of what the Netherlands spent on health per person and yet Japan's life expectancy is two years longer. Turkey spent 2.7 times more than China per person, but achieved an average life expectancy of 74, a year less than China. These instances illustrate the need to develop healthcare policy based on relevant scientific evidence (World Health Organization, 2013). Therefore, at the current rate burgeoning of healthcare spending, combined with a growing variation in medical practice patterns, and poor quality outcomes, there is a demand for better information to improve healthcare decision making, and hence the need for the growth and development of health technology assessment.

Health technology assessment (HTA) refers to the systematic evaluation of properties, effects, and/or impacts of health technology (Drummond *et al.*, 2008). It is a multidisciplinary process to evaluate the social, economic, organizational and ethical issues of a health intervention or health technology (Fronsdal *et al.*, 2010). Properties assessed include evidence of safety, efficacy, patient-reported outcomes, real-world effectiveness, cost, and cost-effectiveness as well as social, legal, ethical, and political impacts (Bingefors, Pashos, Smith & Berger, 2003). Historically, most HTA agencies have focused on producing high quality assessment reports that can be used by a range of decision makers. However, increasingly organizations are undertaking or commissioning HTAs to inform a particular resource allocation decision. The historical

antecedent of HTA dates back to the 1970s in the United States of America (USA) and was stimulated in part by a concern to assure the safety and efficacy of new interventions, but also by concern about rising costs, and the need to ensure that new technologies represented good buys (Zethraeus, 2009). Since the late 1970s, many European countries have similarly established HTA systems to inform healthcare coverage and pricing decisions. HTA reports from NICE, The National Institute for Health and Clinical Excellence is used as a base for recommendations in healthcare in England and Wales (NICE, 2013). Australia and Canada were the first to have cost-efficiency as a requirement for decisions on reimbursement of medicines (Zethraeus, 2009). In Sweden, HTA has been used since 2002 as a standard for the national benefit schemes of drugs decided by The Dental and Pharmaceutical Benefits Agency (Shah *et al.*, 2014). These countries use HTA to systematically determine the relative „value for money“ provided by new technologies and to give providers and patients information to make treatment choices.

HTA increasingly plays an important role in informing reimbursement and pricing decisions and providing clinical guidance on the use of medical technologies across the world (Kularatna *et al.*, 2013). In addition to safety and efficacy information, health economic and outcomes research data are also receiving expanded attention in these assessments in many countries, due to payers seeking better value for money spent on treatments. Economic analysis conducted as part of HTA can address the question of whether a new health technology provides any incremental benefit compared with current practice, and at what incremental cost. When the incremental benefit to patients is high and the incremental cost is low, good value for money is observed (Hutton, Trueman & Henshall, 2007). The information provided by HTA can be used to optimise

the prioritisation of resources in healthcare. Unnecessary or risky investments can thus be avoided. An important issue in HTA is the explicit assessment of the long-term benefit-risk trade-off of technologies, to ensure that unintended harmful consequences are not offsetting the intended clinical benefits. In this way, overall healthcare expenditure can be managed.

Several groups have developed or suggested good practices for the conduct of HTA (Emanuel, Fuchs & Garber, 2007; Hutton, Trueman & Henshall, 2007; Drummond, Schwartz & Jonsson, 2008). However, little is known about actual adherence to such recommended principles within many healthcare organizations, especially in developing countries. HTA is predominantly employed in the context of developed countries. In many poor resource settings in Africa the adoption of HTA and transparent use is still limited (Chalkidou, Levine & Dillon, 2010). The limited use of HTA in Sub-Saharan African (SSA) countries is largely credited to the inadequacies of capacity coupled with a weak health system to implement interventions. Another problematic issue is the limitation of high-quality data availability and lack of research evidence, especially in the context of “resource-limited” health systems like the assessment of health states (Kularatna *et al.*, 2013; Mbondji *et al.*, 2014). Moreover, some HTA methodological aspects do not fit into the setting of developing countries and need to be adapted appropriately on the basis of specific needs of the countries (Chalkidou, Levine & Dillon, 2010). There has never been higher level of systematic evaluation of health technology and the possible alternatives in developing settings with highly constrained resources (Pichon-Riviere, 2012). In Ghana, there is seemingly ad hoc to limited usage of HTA in policy making decisions in the delivery of healthcare services due to limited information. The Ministry of Health (MOH) is piloting the use of HTA

to inform decisions on prioritisation in cost-containment and sustainability strategies of the National Health Insurance Authority (NHIA). This is being applied to the selection of medicines and development of Standard Treatment Guidelines for hypertension, a major chronic condition, which has been identified as a cost-driver under the National Health Insurance Scheme (NHIS) (Ministry of Health, 2016). However, there is still limited information on any form of incentives available for stakeholders in the use of HTA in healthcare decisions in Ghana. The financial and professional incentives facing health care providers are perceived to promote clinically and cost effective health interventions, but achieving this in practice is difficult. Therefore, the current study seeks to investigate the appropriate incentives for the use of health technology assessment in health making decisions in Ghana.

1.2 Problem statement

Ghana is increasingly committing to Universal Coverage for the general populace. In an effort to ensure equitable access to quality healthcare within finite public budgets, Ministries of Health and National Health Insurance Organisations are becoming interested in making available explicit packages of care including medical technologies and healthcare services. However, the absence of adequate information on disease burden estimations, cost-effectiveness studies of interventions, independent evaluations of programme implementation; the current policy-making in the healthcare sector is ad hoc and driven by individual perceptions (Kriza *et al.*, 2014). In Ghana, HTA continues to remain at the drawing board with no visible progress being seen. The various stakeholders are able to however execute their mandates without using HTA, which raises concerns about the scientific basis and economic viability of their decisions.

Evidence suggests that a significant number of medical technologies are of little or no benefit to patients. Under current budgetary pressures, state health care programs cannot afford continued spending on unnecessary medical care without further cuts in enrollment. However, there is currently no public process to formally evaluate new medical interventions in Ghana (MOH, 2016). There is therefore evidence of low level of HTA practice in the various areas of healthcare in Ghana in evaluating alternate healthcare packages. The key challenges are associated with lapses in a supporting legal framework and legitimate processes; lapses in the role of technical capacity and local information. There is a lack of clarity about which HTA tools should be used in Ghana. Furthermore, there are also lesser dedicated institutions to ensure information availability through the institutionalization of the appropriate incentives to the right stakeholders in the healthcare sector to ensure higher level of HTA application.

Considering the predominant adoption of the concept of HTA in the developed world, the larger volume of studies on HTA are concentrated in America, Europe and Asia leaving Africa largely unattended. For instance, the studies of Lin, Dudley & Redberg (2007), Deyo & Patrick (2005) and Fisher (2012) concentrated on the penetration of the concept of HTA in Europe whereas Panerai *et al.* (2014) and Pichon-Riviere *et al.* (2012) concentrated on Latin America. The limited studies in Africa largely investigate the driving factors for the HTA implementation failure largely ignoring the various ad hoc practices of HTA and the possibility of appropriate financial and professional incentives to enhance information availability and hence fertile ground for HTA implementation. These research gaps provide justification for the current study to

investigate the appropriate incentives for the use of HTA in healthcare decision making in Ghana.

1.4 Research Questions

On the basis of the increasing cost of technological investment in the health sector in Ghana, and the limited information on such developments calls for stern investigation and provision of pertinent answers for salient questions including:

1. Are there policies or framework on HTA?
2. On what basis are health care decision made?
3. Is HTA an input for health care decision making?
4. What are the incentives and disincentives for using HTA?

1.3 Objectives of the study

The general objective of the study is to examine the incentives and disincentives for the usage or non-usage of health technology assessment in making decisions in the health sector in Ghana.

1.3.1 Specific Objectives

1. To assess the knowledge level of Healthcare managers on HTA;
2. To examine existing policies or framework of HTA in the health system of Ghana;
3. To assess the basis for health care decision in the health system of Ghana;
4. To assess the incentives and disincentives for using HTA in healthcare decision making; and
5. To identify the areas of usage of HTA in healthcare in Ghana.

1.5 Significance of the study

The result of the current study would be of significance to several stakeholders in the delivery of healthcare in Ghana. Among the stakeholders are policy-makers (payers), medical products developers (industry), healthcare professionals (physicians, specialist, nurses etc.), the academic community (researchers), general public (taxpayers; insured population; informal sector), patients and their families, NGOs/third sector and donors. The policy makers like the Ministry of Health and the Ghana Health Service could rely on the possible information on the conditions or factors necessary for the implementation of HTA in Ghana to upgrade the existing HTA policies against the standard best practices of HTA. The identification of the functional areas in the health sector in Ghana where HTA is used would assist the Ministry of Health to upgrade the existing policies and further adapt HTA best practices in the other essential sectors of healthcare in Ghana. The Ministry of Health on the basis of the result of the study could also implement definite incentives at the various hospitals in Ghana to ensure to higher adherence to HTA practices among the various healthcare professionals in Ghana. Healthcare professionals would also rely on information provided through the current study to advocate for the adoption of appropriate and most economical methods medical technology for providing care. Marketers or producers of medical products would be motivated to produce standardized medical products for value for money.

Moreover, there is limited literature on HTA implementation in SSA due to the limited usage of the method in poor resourced countries. There are scarce studies on HTA in Africa as studies on the subject of HTA are concentrated in America, Europe and Asia. The current study would therefore provide researchers with information on the existing

HTA policy(ies) in Ghana and the conditions/factors necessary for the implementation of HTA in Ghana.

Good information is a prerequisite for an efficient and effective health care system. Nonetheless, transparency has fallen short of its potential in health because data do not exist or are not made available. The various hospitals in Ghana collate data on cost but rarely publish for public consumption. There is also barely no data on the performance of individual health professionals per cost or quality metrics. Progress to introduce national electronic health records has been slow, with voluntary uptake provisions and concerns about privacy partly responsible. Governments collect large amounts of administrative data, but have a poor track record in allowing researchers to access these data or to link datasets. This is to the detriment of research into more effective health care. These informational gap or lapses in the healthcare system therefore impedes the implementation and full adoption of HTA. On the basis of these lapses and the inadequacy of literature on the HTA implementation vacuum in Africa, the current study sought to investigate the appropriate incentives for the use of HTA in healthcare decision making in Ghana.

1.6 Scope of the Study

Conceptually the study focused on the role of HTA in healthcare management, the conditions or factors necessary for implementation of HTA, the existing policy(s) in Ghana for health technology assessment and the areas of usage of HTA in healthcare in Ghana. The study also focused on the micro and macro levels of the health systems. At the macro level the Komfo Anokye Teaching Hospital (KATH) in Kumasi was used as case study. At the macro level, HTA framework and guidelines will be reviewed from

the WHO, Ministry of Health and other health partners. The policy makers, administrators and healthcare professionals will also be contacted.

1.7 The Conceptual Framework of the Study

Health institutions engaged or adopt HTA in an attempt to ensure cost effectiveness, safety, healthcare effectiveness and efficacy. The adoption of the HTA in various health facilities are largely influenced by factors such as price, availability of alternative(s), emerging pathogens and other disease threats, third-party payment, financial incentives, malpractice avoidance, provider competition, public demand, value for money and the quality of life. The dimensions of HTA often given consideration by the health facilities include comparative clinical effectiveness, comparative cost-effectiveness, service delivery organisation aspects, legal framework and the ethical, social implications. These dimensions of HTA are commonly applied in healthcare areas such as drugs, biologics, devices, equipment and supplies, medical and surgical procedures, support systems, organizational and managerial. The application of HTA in these sectors of the healthcare delivery system is meant to achieve varying health outcomes including recovery time, survival, deliveries and many others. The established concept regarding HTA is illustrated in

Figure 1.1.

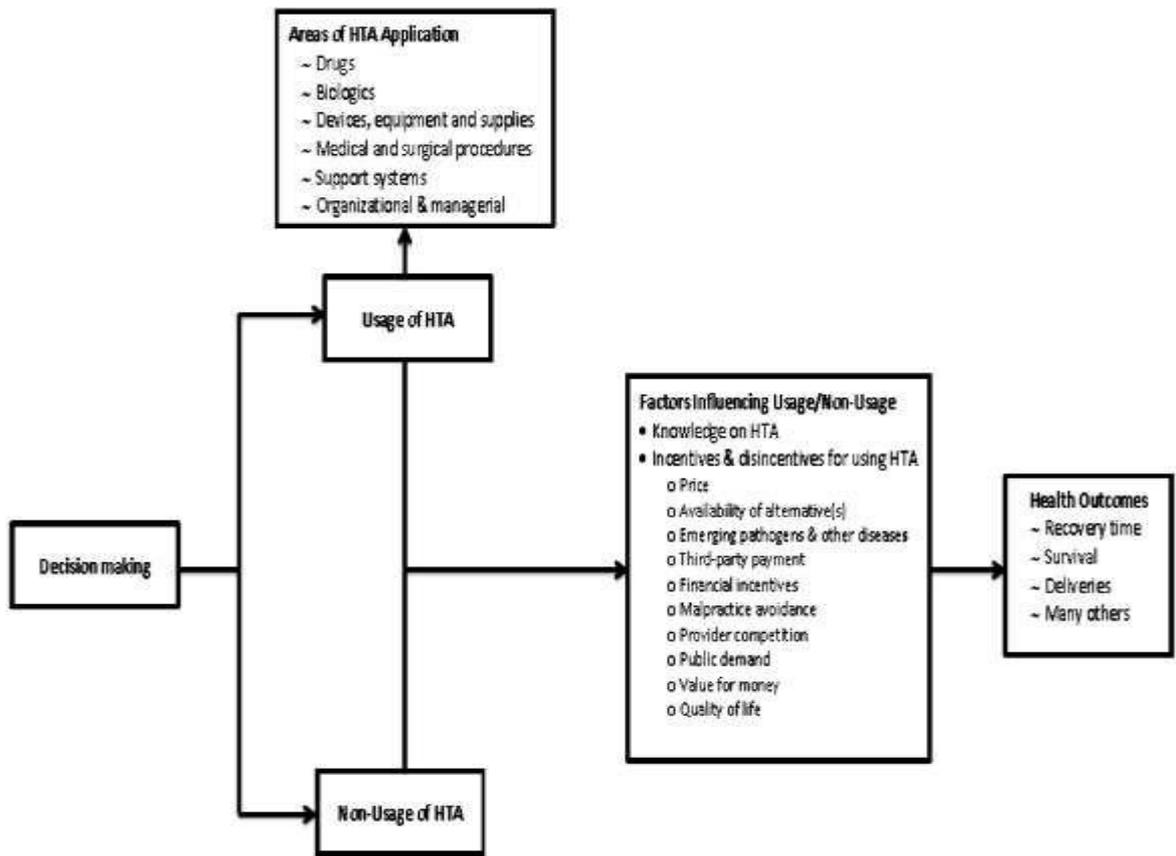


Figure 2.1: Conceptual Framework
 Source: Author's Own Construct (2017)

1.8 Organisation of the Study

The study was organized into six chapters. The Chapter One introduced the study through elaboration on topical areas like the background of the study, the problem statement, the objectives and research questions, the significance of the study, and the scope of the study. The review of pertinent literatures relating to HTA was carried out in the chapter two of the study. The Chapter Three of the study elaborated on the methodology and the profile of the study institution. The Chapter Four of the study presented the result of the study and the analyses. The Chapter Five of the study presented the discussion of the result of the study. The Chapter Six of the study concluded and recommended policies for HTA enhancement and application in healthcare delivery.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter reviews literatures related to the health system in Ghana, the concept of Technology Assessment (TA) and Health Technology Assessment (HTA), origins of technology assessment, purposes and areas of HTA application, factors affecting HTA adoption in healthcare delivery, ten basic steps of HTA, HTA tools and comparative measures, effects and impacts of local/hospital-based HTA activities and the barriers in the HTA implementation process. The last section of the chapter also expatiates on the conceptual framework guiding the current study.

2.2 Health system in Ghana

Health systems are complex, multidimensional domains of actors and actions, which produce outcomes that societies value (Shakrishvili *et al.*, 2000). Stakeholders include patients, various types of health-care providers, payers, purchaser organizations, regulators, government and the broader citizenry (Smith, Mossialos, Papanicolas & Leatherman, 2009). People and their power in deciding, shaping and responding to change are central to health systems (WHO, 2007). Health systems are dynamic, evolving, fluid, complex and adaptive rather than static entities. They are governed by feedback, and organize and adapt based on experience. Outcome goals of health systems are to: improve health; be responsive to the legitimate non-health expectations of the population e.g. prompt treatment, treatment with dignity; and ensure fairness in financial contributions. The level of goal attainment e.g. life expectancy, maternal mortality, infant mortality; as well as the distribution of the goal within the population (equity) are important.

In Ghana, the healthcare system is organised under four main categories of delivery systems: public, private-for-profit, private-not-for-profit and traditional systems. Though the former three are mostly associated with healthcare delivery in Ghana, efforts are being made since 1995 to integrate traditional medicine into the orthodox mainstream (Abor, Abekah-Nkrumah & Abor, 2008). The public health care system of Ghana is operated through the National Health Insurance Scheme (NHIS), which permits the operation of three types of insurance schemes, including District-Wide (Public) Mutual Health Insurance schemes in all of the country's 110 districts, private mutual insurance schemes and private commercial insurance schemes. However, only the District-Wide (Public) Mutual Health Insurance schemes are financially supported by the NHIS (Hepnet, 30 June 2007). The operation of private mutual insurance and private commercial insurance schemes are permitted by Ghana's National Health Insurance Scheme, along with that of District-Wide (Public) Mutual Health Insurance schemes, in order to give Ghanaians "the opportunity to join a health insurance scheme of their choice" (IRIN, 18 March 2004). The faith-based health services in Ghana provide approximately 40% of the available health care (Ecumenical Pharmaceutical Network (EPN), 2005). the church health care facilities in Ghana number[ed] 56 hospitals and 83 clinics at the time of research (EPN, 2005).

Health Administration in Ghana is divided into three administrative levels: the national, regional and districts levels. It is further divided into five functional levels of national, regional, district, sub district and community levels. All the levels of administration are organised as Budget and Management Centres (BMCs) or cost centres for the purpose of administering funds by the Government and other stakeholders. There are a total of 223 functional BMCs and 110 Sub-Districts BMCs.

With the headquarters of the Ghana Health Service (GHS) also managed as a BMC, there are 10 Regional Health Administration, 8 Regional Hospitals, 110 District Health Administrations and 95 District Hospitals. All of these are run as BMCs (GHS, undated-b).

The two governmental bodies that oversee health care infrastructure and delivery in Ghana are the Ministry of Health (MOH) and Ghana Health Services (GHS). Until 1996, the MOH oversaw the direct provision of health service delivery in Ghana. Today, health service delivery is provided by GHS. The goal of MOH is to improve the health status of all people living in Ghana through effective and efficient policy formulation, resource mobilization, monitoring and regulation of delivery of health care by different health agencies (MOH, 2012). MOH works on policy formation, the monitoring and evaluation of health service delivery throughout the country, resource allocation for health services and the regulation of health services delivery. MOH also develops the framework for the regulations of food, drugs and health service delivery. The organisations that are under the oversight of the MOH include Ghana Health Services, Korle-Bu Teaching Hospital (located in Accra), Komfo Anokye Teaching Hospital (located in Kumasi), Christian Health Association of Ghana, Ghana Ambulance Service, Ghana Medical and Dental Council, Pharmacy Council, Ghana Registered Nurses and Midwives Council and Traditional and Alternative Medicine Council. The MOH includes directorates such as Policy, Planning, Monitoring and Evaluation (PPME); Research, Statistics and Information Management (RSIM); Human Resource Development and Management (HRDM); Administration (Admin); Procurement and Supplies (P&S); Traditional and Alternative Medicine (TAM); and Finance (FIN).

The second governmental body that works with health care in Ghana is GHS, an “autonomous Executive Agency responsible for implementation of national policies under the control of the Minister for Health through its governing Council - the Ghana Health Service Council. The GHS “continues to receive public funds and thus remains within the public sector” (Abor, Abekah-Nkrumah & Abor, 2008). This organization is the service provision arm of the health care system in the country, and works to implement national health care policies, provide health care services and manage resources for health care delivery. The functions of GHS include: developing strategies and technical guidelines to achieve national policy goals and objectives, Undertaking management and administration of health resources within GHS, promoting healthy living and habits among residents and many others.

There are three administrative levels of GHS and five functional (service distribution) levels of health care in Ghana. The administrative levels of GHS include national level (Ghana Health Service Council; Office of the Director General and Deputy Director General; Eight National Divisional Directors), and regional level. The Regional level health facilities are headed by 10 Regional Directors of Health Services, supported by Regional Health Management Teams and Regional Health Committees. The district level health facilities are headed by District Directors of Health Services, supported by the District Health Management Teams, District Health Committees and Sub District Health Management Teams. The functional levels of health care service distribution in Ghana are the national level, regional level, district level, sub-district level and community level.

2.3 Overview of Health Technology Assessment (HTA)

Technology is the practical application of knowledge. Technology Assessment (TA) is a category of policy studies, intended to provide decision makers with information about the possible impacts and consequences of a new technology or a significant change in an old technology. It is concerned with both direct and indirect or secondary consequences, both benefits and challenges, and with mapping the uncertainties involved in any government or private use or transfer of a technology. TA provides decision makers with an ordered set of analyzed policy options, and an understanding of their implications for the economy, the environment, and the social, political, and legal processes and institutions of society (Coates, 1992). Technology assessment is a form of policy research that examines short- and long-term social consequences (for example, societal, economic, ethical, legal) of the application of technology. The goal of technology assessment is to provide policy-makers with information on policy alternatives (Banta, 1993).

HTA is the process of examining and reporting properties of a medical technology used in health care, such as safety, efficacy, feasibility, and indications for use, cost, and cost-effectiveness, as well as social, economic, and ethical consequences, whether intended or unintended (Institute of Medicine, 1985). Health Technology Assessment considers the effectiveness, appropriateness and cost of technologies. It does this by asking four fundamental questions: Does the technology work, for whom, at what cost, and how does it compare with alternatives? (UK National Health Service R&D Health Technology Assessment Programme, 2003). Technology in this sense is a broad term, including medical devices, pharmaceuticals, procedures, therapies, or systems. In clinical terms, HTA can serve to assess a product's efficacy, effectiveness, and cost

benefits. Health Technology Assessment describes a structured analysis of a health technology, a set of related technologies, or a technology-related issue that is performed for the purpose of providing input to a policy decision (U.S. Congress, Office of Technology Assessment, 1994). HTA describes the technology and its use, which technology is clinically effective, for whom, how it compares with current treatments, [and] at what cost (Canadian Coordinating Office for Health Technology Assessment, 2002). HTA is a multidisciplinary field of policy analysis. It studies the medical, social, ethical, and economic implications of development, diffusion, and use of health technology (International Network of Agencies for Health Technology Assessment, 2002). Health Technology Assessment is the systematic evaluation of properties, effects or other impacts of health technology. The main purpose of HTA is to inform policymaking for technology in health care, where policymaking is used in the broad sense to include decisions made at, e.g., the individual or patient level, the level of the health care provider or institution, or at the regional, national and international levels. HTA may address the direct and intended consequences of technologies as well as their indirect and unintended consequences.

The three modes of describing health care technology are its material nature, its purpose, and its stage of diffusion. In terms of its material nature, the term “technology” connotes “hardware” or other mechanical devices or instrumentation; to others, it is a short form of “information technology” such as computer software. However, the practical application of knowledge in health care is quite broad. Broad categories of health technology include drugs, biologics, devices, equipment, supplies, medical and surgical procedures, Support systems, Organizational and managerial systems. On the basis of purpose or application, technology is categorized on the basis of healthcare

purpose i.e. Prevention, Screening, Diagnosis, Treatment and Rehabilitation. Some technologies are used for diagnosis as well as treatment, e.g., coronary angiography to diagnose heart disease and to monitor coronary angioplasty. Implantable cardioverter defibrillators detect potentially life-threatening heart arrhythmias and deliver electrical pulses to restore normal heart rhythm. Electronic patient record systems can support all of these technological purposes or applications.

Certain "boundary-crossing" or "hybrid" technologies combine characteristics of drugs, devices or other major categories of technology (Goodman, 1993; Lewin Group, 2001). Among the many examples of these are: photodynamic therapy, in which drugs are laser-activated (e.g., for targeted destruction of cancer cells); local drug delivery technologies (e.g., implantable drug pumps and drug inhalers); spermicidal condoms; and bioartificial organs that combine natural tissues and artificial components. Examples of hybrid technologies that have complicated regulatory approval and coverage decisions in the past decade years were gallstone lithotripters (used with stone-dissolving drugs) (Zeman, 1991), positron emission tomography (PET, used with radiopharmaceuticals) (Coleman, 1992), and metereddose inhalers (Massa 2002). The stage of diffusion is assessed at different stages of diffusion and maturity. In general, health care technologies may be described as being future, experimental, established and obsolete. Often, these stages are not clearly delineated, and technologies do not necessarily mature through them in a linear fashion. A technology may be investigational for certain indications, established for others, and outmoded or abandoned for still others, such as autologous bone marrow transplantation with high dose chemotherapy for certain types of advanced cancers. Many technologies undergo multiple incremental innovations after their initial acceptance into general practice (Gelijns & Rosenberg, 1994; Reiser, 1994). Further, a technology that was once

considered obsolete may return to established use for a better defined or entirely different clinical purpose (Baidas, 2002).

2.4 Origins of Technology Assessment

Technology assessment (TA) arose in the mid-1960s from an appreciation of the critical role of technology in modern society and its potential for unintended, and sometimes harmful, consequences. Experience with the side effects of a multitude of chemical, industrial and agricultural processes, and such services as transportation, health, and resource management contributed to this understanding. Early assessments concerned such topics as offshore oil drilling, pesticides, automobile pollution, nuclear power plants, supersonic airplanes, and the artificial heart. TA was conceived as a way to identify the desirable first-order, intended effects of technologies as well as the higher-order, unintended social, economic and environmental effects (Brooks & Bowers, 1970).

The term “technology assessment” was introduced in 1965 during deliberations of the Committee on Science and Astronautics of the US House of Representatives. Congressman Emilio Daddario emphasized that the purpose of TA was to serve policymaking. Technical information needed by policymakers is frequently not available, or not in the right form. A policymaker cannot judge the merits or consequences of a technological program within a strictly technical context. He has to consider social, economic, and legal implications of any course of action (US Congress, House of Representatives 1967). In the United States, the Congress commissioned independent studies by the National Academy of Sciences, the

National Academy of Engineering (NAE), and the Legislative Reference Service of the Library of Congress that significantly influenced the development and application of TA. These studies and further congressional hearings led the National Science Foundation to establish a TA program and, in 1972, Congress to authorize the congressional Office of Technology Assessment (OTA), which was founded in 1973, became operational in 1974, and established its health program in 1975. Many observers were concerned that TA would be a means by which government would impede the development and use of technology. However, this was not the intent of Congress or of the agencies that conducted the original TAs. In 1969, an NAE report to Congress emphasized that: Technology assessment would aid the Congress to become more effective in assuring that broad public as well as private interests are fully considered while enabling technology to make the maximum contribution to our society's welfare (National Academy of Engineering 1969).

With somewhat different aims, private industry used TA to aid in competing in the marketplace, for improving understanding of the future business environment, and for producing options for internal and external decision makers. TA methodology drew upon a variety of analytical, evaluative and planning techniques. Among these were systems analysis, cost-benefit analysis, consensus methods (e.g., Delphi method), engineering feasibility studies, clinical trials, market research, technological forecasting, and others. TA practitioners and policymakers recognized that TA is evolving, flexible, and should be tailored to the task (US Congress, Office of Technology Assessment 1977).

2.5 Purposes and Areas of HTA Application

The key healthcare areas of HTA application include drugs, biologics, devices, equipment and supplies, medical and surgical procedures, support systems and

organizational and managerial (US Congress, Office of Technology Assessment 1977). HTA can be applied in these areas of healthcare to advise or inform technology-related policymaking. HTA is used by the regulatory agencies such as the US Food and Drug Administration (FDA) about whether to permit the commercial use (e.g., marketing) of a drug, device or other technology. Healthcare payers, providers, and employers on whether technologies should be included in health benefits plans or disease management programs, addressing coverage (whether or not to pay) and reimbursement (how much to pay) also employ HTA. Hospitals, health care networks, group purchasing organizations, and other health care organizations about decisions regarding technology acquisition and management also involves HTA.

HTA contributes in many ways to the knowledge base for improving the quality of health care, especially to support development and updating of a wide spectrum of standards, guidelines, and other health care policies. For example, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the National Committee for Quality Assurance (NCQA) set standards for measuring quality of care and services of hospitals and other health care institutions. Health professional associations (e.g., American College of Cardiology, American College of Physicians, American College of Radiology, American Medical Association) and special panels (e.g., the US Preventive Services Task Force of the Agency for Healthcare Research and Quality) develop **clinical practice guidelines**, standards, and other statements regarding the appropriate use of technologies. Standards-setting organizations such as the American National Standards Institute and the American Society for Testing and

Materials coordinate development of voluntary national consensus standards for the manufacture, use and reuse of health devices and their materials and components.

2.6 The Basis for Health Care Decision in Healthcare Delivery

In many parts of the world, there are variations in healthcare systems regarding efficiency and sustainability (CPME, 2011). In the developed settings, there is regulated healthcare supply and the challenge of a responsible budget allocation across an increasing number of new health technologies (Tervonen *et al.*, 2011). However, the developing world is largely affected by poorly regulated healthcare system and serious challenges regarding budget allocation across the available health technologies (Annemans *et al.*, 2011). Media hype, marketing and politics often have more influence on how new medical advances get used than the best scientific evidence (Deyo & Patrick, 2005). Recent literature indicates that the contemporary consumer is increasingly becoming aware of the possible insecurity in terms of loss of cost control and poor healthcare delivery (Survey of Health Care Consumers, 2011). The healthcare providers also acknowledge the usage of outdated and less effective technologies in the delivery of healthcare in these modern times (CPME, 2011). Researchers have also further brought to light several obstacles to optimal use of HTA information including the knowledge gap due to limited access to scientific literature; quality and generalisability issues of HTA reports; inflexibility of the budgets (McGhan *et al.*, 2009). Patient's awareness has often stimulated the call for modern technologies and health technological assessment. Studies in Wisconsin suggested higher risk of prostate associated with Robotic-assisted laparoscopic prostatectomy (RALP) surgeries (Neuner *et al.*, 2012). This consumer awareness therefore stimulated the outcry of the public for more modern technological alternatives (Jin *et al.*, 2011).

The common factors perceived to influence HTA implementation in any healthcare facility include the re-thinking scientific dialogue and multi-stakeholder engagement, and re-thinking value, affordability, and access (Husereau *et al.*, 2016). HTA requires earlier and ongoing engagement to steer the innovation process and help achieve appropriate use across the technology lifecycle (Husereau *et al.*, 2016). Patients need to be involved throughout, and particularly at the early stages (Husereau *et al.*, 2016). The timely delivery of relevant reports to clearly determine policy receptor (decision-making) points is also an essential factor in the HTA implementation process (Fronsdal *et al.*, 2010). To achieve this, the breadth of assessment, implementation initiatives such as incentives and targeted, intelligent dissemination of HTA result, needs to be considered.

The market and method of payment for healthcare also affects the adoption of HTA in healthcare delivery. In situations where healthcare is predominantly paid for out of pocket, which healthcare services and products are funded is a product of the decisions made by individual patients and their doctors. There is little incentive for collective decision making about healthcare technologies, other than in relation to questions as to whether services such as vaccination are provided by the public sector. Whilst, in principle, there would be a role for HTA in a self-pay market in providing evidence to doctors and patients about “what works,” opportunities for dissemination may be limited and it is not clear who would fund such an exercise (Neumann & Tunis, 2010). In this context, the healthcare systems could benefit from a revision of certain organizational and financial principles.

2.7 Ten Basic Steps of HTA

There is great variation in the scope, selection of methods and level of detail in the practice of HTA. Nevertheless, most HTA activity involves some form of the basic steps including: 1) Identify assessment topics; 2) Specify the assessment problem; 3) Determine locus of assessment; 4) Retrieve evidence; 5) Collect new primary data (as appropriate); 6) Appraise/interpret evidence; 7) Integrate/synthesize evidence; 8) Formulate findings and recommendations; 9) Disseminate findings and recommendations and 10) Monitor impact.

Not all assessment programs conduct all of these steps, and they are not necessarily conducted in a linear manner. Many HTA programs rely largely on integrative methods of reviewing and synthesizing data from existing primary data studies (reported in journal articles or from epidemiological or administrative data sets), and do not collect primary data. Some assessment efforts involve multiple cycles of retrieving/collecting, interpreting, and integrating evidence before completing an assessment. For example, to gain regulatory approval (e.g., by the US FDA) to market a new drug, pharmaceutical companies typically sponsor several iterations of new data collection: preclinical testing in the laboratory and in animals and phase I, II, and III studies in humans; additional phase IV post marketing studies may be a condition of approval. The steps of appraising and integrating evidence may be done iteratively, such as when a group of primary data studies are appraised individually for quality, then are integrated into a body of evidence, which in turn is appraised for its overall quality. Depending upon the circumstances of an HTA, the dissemination of findings and recommendations and monitoring of impact may not be parts of the HTA itself, although they may be important responsibilities of the sponsoring program or parent

organization. Another framework for HTA is offered by the European Collaboration for Health Technology Assessment (Busse, 2002), as: Submission of an assessment request/identification of an assessment need, Prioritisation, Commissioning and conducting the assessment. The conduction of the assessment involves the definition of policy question(s), Elaboration of HTA protocol, Collecting background information/determination of the status of the technology, Definition of the research questions, Sources of data, appraisal of evidence, and synthesis, Safety, Efficacy/effectiveness, Psychological, social, ethical, Organizational, professional, Economic, Draft elaboration of discussion, conclusions, and recommendations, External review and the publishing of final HTA report and summary report.

2.8 Existing Policies of HTA in Healthcare Delivery

This section of the study examines and reviews existing policies of HTA in healthcare delivery. The common existing policies are in the areas of efficacy and effectiveness, cost-benefit analysis etc.

2.8.1 Efficacy and Effectiveness

Efficacy is not effectiveness. Efficacy research generates narrowly focused data that does not address clinical practice conditions, patients with co-morbidities, or other variables. “Efficacy” can be ascertained through Randomized Controlled Trials (RCT). In pharmaceutical research RCTs compare a new drug to a placebo under controlled conditions to test a drug’s efficacy. These studies remove, to the extent possible, any variance between subject groups, and quantify outcomes based on intermediate measures such as blood pressure or cholesterol level (as opposed to clinical outcomes such as cardiovascular mortality) (International Agency for Cancer Research (IARC),

2009). A treatment's effectiveness, on the other hand, measures the health outcome in routine clinical practice across different settings. It compares a drug, device or treatment, not to a placebo, but rather to alternative forms of treatment. Because this evidence is commonly based on epidemiological and observational data, it can be seen as less certain, relatively weaker evidence. The value of certainty is important in evidence-based decision making, and is discussed in the following section.

2.8.2 Strength of Evidence

At what point can a service be deemed safe and effective enough for introduction into clinical use? The tension between scientific rigor and timely reporting of results is a subject of debate. Teutsch *et al.* argues, "the full range of potential benefits and risks associated with therapeutic decisions across the range of potential clinical applications is not known until long after the technologies have been widely adopted." (Anderson & Rosenberg, 1998) A continuous feedback of information based on clinical effectiveness may be necessary to achieve maximum effectiveness. Satisfactory evidence varies with the characteristics of the treatment. RCTs, for example, are more appropriate when high levels of certainty are needed, where the burden of illness, risks, and costs for interventions are high. Other interventions may need less rigorous studies to reach a proper level of certainty. Most medical and clinical decisions are made using available evidence, using a combination of RCT findings and literature meta-analyses (Jemal, Ward, & Thun, 2005).

Aggregating clinical data across providers and payers is gaining significant attention as a way to strengthen scientific evidence. Rowe points out that the development of electronic health records (EHR) can greatly improve the content and usefulness of aggregated

databases (Youlden, Cramb & Baade, 2008). Through EHRs, it will be possible to include clinical experiences from millions of patients in real time. Lynn Etheredge predicts that EHRs and CCEs will not replace RCTs, but will effectively create a “Rapid-Learning System” to fill “major knowledge gaps” in healthcare costs, risks and benefits, and geographical variations (Bray & Weiderpass, 2010). EHRs will be able to readily report data from millions of patients, including variables such as genetic markers and environmental factors, and thereby facilitate evidence-based decision making by clinicians and policymakers to make improved, evidence-based decisions.

2.8.3 Cost Analysis

The relative costs of alternative treatments and services are one aspect of HTA. Cost analyses can become controversial when they become part of health policy decisions (coverage, reimbursement) or medical decision making (Ezzati *et al.*, 2005). A policy decision made at the health plan or government level that limits a particular treatment or expensive drug based on cost may be perceived as rationing care from an individual patient’s point of view. Cost analyses include a number of approaches, including Cost-benefit analysis (CBA) and Cost-effectiveness analysis (CEA). CBA measures costs and outcomes in monetary units, though it is difficult (and contentious) to assign monetary values to health outcomes such as length and quality of life (Ezzati & Lopez, 2003). CEA, on the other hand, uses direct health outcomes such as quality-adjusted life years (QALYs), when assessing a service’s cost. Services are not solely judged on cost-effectiveness; their effectiveness also is judged in comparison to another service.

2.9 Effects and Impacts of Local/Hospital-Based HTA Activities

Different types of HTA activities stimulate varying levels of effect and impact on the decision-making of hospitals are discussed in this section. Financial benefits have been

reported in some limited studies (Luce & Brown, 1995; Patail & Aranha, 1995), in terms of the minimum cost related to a technology. The study of Cram *et al.* (1997) in the USA using 33 clinical engineering departments revealed that HTA is largely used to cut down cost and provide more standardized technologies to hospitals. The study further emphasized that the system allows broader input into decision-making processes. Luce and Brown (1995) in an interview with participants from 30 organizations (hospitals, health maintenance organizations, and third-party payers) revealed that Hospital decision makers used HTA almost exclusively for making purchasing decisions and as a means of controlling expenditures. Decisions were based on financial assessment with little or no formal evaluation of changes in patient outcomes or medical practice patterns. Luce and Brown (1995) further reported that purchase or non-purchase recommendations were rarely contravened by management and were distributed to relevant departments throughout the organization. The study of Luce and Brown (1995) indicated that new health technologies priced over predetermined thresholds (US \$100,000 or \$250,000) were all assessed prior to purchase. Menon and Marshall (1990) in their survey of 50 teaching hospitals across Canada indicated that HTA decisions were employed in decision-making about the purchasing of new technologies. The study further revealed that clinicians perceive the need for formal management structure for HTA in teaching hospitals. Patail and Aranha (1995) in case study of a major teaching hospital in the United States reported that out of the total 16 technologies formally approved in the period between 1988 and 1993, 13 were implemented. The study further indicated that HTA informed the decision of engineers and other decision makers and the decisions were predominantly made on technologies worth more than \$500,000.

Poulin *et al.* (2012) in a case study of HTA program outcomes in Canada indicated that of the 68 technologies for which a HTA was requested, 15 were incomplete and dropped, 12 were approved, 3 were approved on an urgent/emergent basis, 21 were approved for “clinical audit” on a restricted basis, 14 were approved for research use only, and 3 were referred to additional review bodies. The study of Poulin *et al.* (2012) further indicated that decisions based on local HTA program recommendations were rarely “yes” or “no”. Many technologies were given restricted approval, with full approval contingent on satisfying certain conditions such as clinical outcomes review, training protocol development, or funding. Poulin *et al.* (2012) also reported that cost was the first reason behind the rejection of a technology and followed by health gains. Rosenstein *et al.* (2003) in a survey of 19 hospitals in western USA indicated that the HTA committees had direct responsibility for approval. The HTA committees were not accorded the final say in decision making concerning health technologies acquisition. Saaid (2011) in a multicase study using 4 hospitals (3 private and 1 public) indicated that one out of four of the hospitals have formal HTA committees. The study of Saaid (2011) further indicated that the impact of HTA as a support tool for decision makers was minimal. Decisions in private for-profit hospitals were informal and driven by business strategy and cost-effectiveness of the technology. However, for the public hospital, HTA was a requirement in decisionmaking, but the process was new. In another study, Weingart (1995) in a case study of a major teaching hospital in the United States indicated that decision makers at the hospital did not go far enough in their discussions to evaluate the institutional strategy or strategic implications of the technology. They lacked expertise in assessing feasibility and profitability.

Bodeau-Livinec *et al.* (2006) in a semi-directive interviews and survey in France reported that 10 of 13 recommendations of HTA committees had an impact on the introduction of the technology in health organizations. The study further reported that one technology did not have impact on health outcome and the impact of two technologies was impossible to assess due to limited information. Bodeau-Livinec *et al.* (2006) further indicated that the main criterion upon which to base a new technology introduction decision on HTA is the cost. Lee *et al.* (2003) in a case study in Canada revealed positive financial gains through HTA. Lee *et al.* (2003) reported that on an evaluation to address the issue of arthroplasty operations, savings were estimated at CAN\$1 million annually through orthopedic supply standardization and a new contract with vendors. In a similar study by McGregor (2012) in Canada using mixed methods (interviews and financial analysis) indicated that out of the 63 health technologies recommended, 45 produced positive health outcomes and hence were incorporated into the hospital policy. McGregor and Brophy (2005) also indicated that the acceptance of 19 recommendations of HTA have resulted in the conservation of hospital resources. The study indicated that the extent of these savings could be estimated in the case of 15 reports: estimated overall savings of CAN\$ 9,840,270. Over the 8 years of full functioning of the HTA unit: average annual quantifiable savings have been CAN\$ 1,140,958. Mitchell (2010) in a case study in the USA indicated that the HTA units helped decision makers integrate patient needs and medical staff interests and capabilities with the hospital's resources (i.e., staff, facilities, financing). The study further indicated that the HTA committees in hospitals speed up the delivery of newly developed treatment technologies and coordinated their acquisition and implementation. Veluchamy and Alder (1989) in the USA also reported that HTA committees in the hospitals provided better access to new technologies for patients and

reduced length of stay. Furthermore, physicians derived personal and professional satisfaction from participation in the HTA units.

These units have improved relations between medical staff and hospital management (better communication and physicians' needs better fulfilled) (Veluchamy & Alder, 1989; Mitchell, 2010).

The study of Schumacher and Zechmeister (2013) in a mixed method study in Austria indicated that hospital associations used HTA for investment/reimbursement decisions, treatment guidelines, and budget allocation, as well as for the preparation of negotiations. Schumacher and Zechmeister (2013) further reported that with the exception of the rapid technology assessment program for single hospital procedures, selective use of HTA reports was identified, rather than standardized inclusion of HTA into the processes. Schumacher and Zechmeister (2013) also reported that several technologies, identified as showing patterns of over-usage, were used more restrictively after the HTA report was published, leading to a decrease in expenditure. Expenditure decrease accounted for at least several million euros for single hospital associations. Zechmeister and Schumacher (2012) in an earlier study also indicated that 5 full HTA reports and 56 rapid technology assessments were used for reimbursement decisions, while 4 full HTA reports and 2 rapid assessments were used for disinvestment decisions and resulted in reduced volumes and expenditure. There were 2 full HTA reports showing no impact on decision-making. Impact was most evident for hospital technologies. Zechmeister and Schumacher (2012) also reported several millions of euros were saved due to HTA recommendations. For

disinvestment decisions, cost savings were about 3 million euros per report, with huge variation (0–12 million). Savings were frequently for more than one hospital (regional hospital associations).

Finally, regarding the impact on hospital policies and management, although miniHTA is widely used in hospitals in Denmark as the principal basis for decisionmaking, the Ehlers et al. study (2006) reported that no decision makers based their decisions exclusively on them. Mini-HTA could ease technology implementation to a considerable degree; through their local participation in the analysis, stakeholders may acquire a better understanding of the new technology and become more willing to implement it (Ehlers & Jensen, 2006). The study by Folkersen and Pedersen (2006) showed similar positive effects of the use of mini-HTA in one major Danish hospital: a greater level of contact between doctors and administrative staff and improved relationships between health professionals and economists, which have often been problematic due to the perception of competing priorities (quality vs. budget). A satisfaction rate of 77% with the HTA method among respondents has also been found in this study

Notwithstanding the revealed benefits of HTA, Some technologies after their diffusion were found to be ineffective or harmful. Examples of these technologies include Autologous bone marrow transplant with high-dose chemotherapy for advanced breast cancer, Colectomy to treat epilepsy, Diethylstilbestrol (DES) to improve pregnancy outcomes, Electronic fetal monitoring during labor without access to fetal scalp sampling, Episiotomy (routine or liberal) for birth, Extracranialintra cranial bypass to reduce risk of ischemic stroke, Gastric bubble for morbid obesity, Gastric freezing for

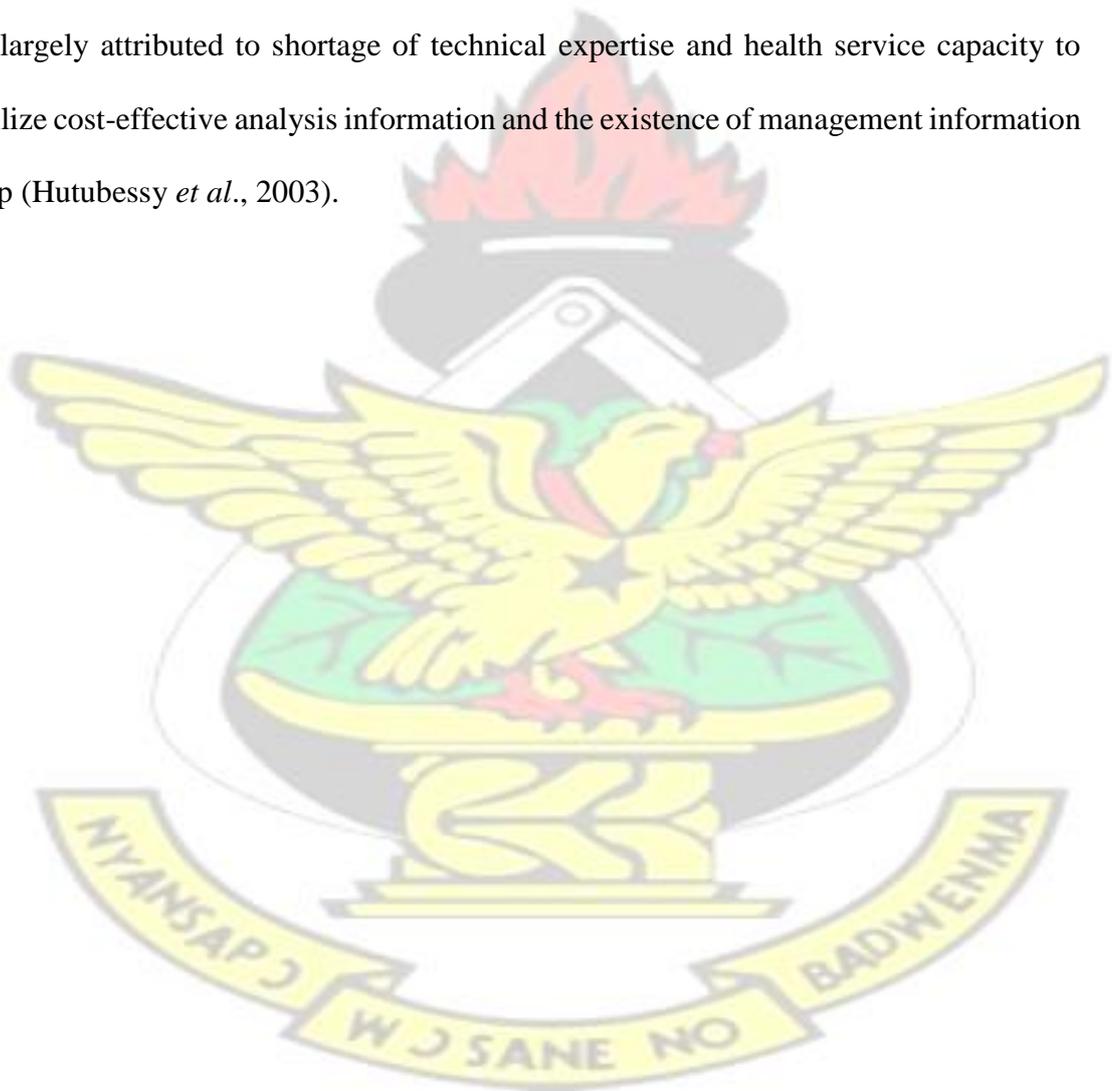
peptic ulcer disease, Hormone replacement therapy for healthy menopausal women, and Hydralazine for chronic heart failure (Coplen 1990; Passamani 1991; Grimes 1993; Enkin 1995; Mello 2001; Fletcher 2002; Rossouw 2002).

2.10 The Incentives and Disincentives for Using HTA in Healthcare Decision Making

The main problems perceived in HTA processes include internal politics, lack of understanding that could lead committees to make poor decisions (Cram *et al.*, 1997). Saaid (2011) also attributed the key challenges in the HTA implementation process to ignorance and unfamiliarity with HTA. The HTA processes also have the tendency to fail due to inadequate expertise in assessing the feasibility and profitability of technologies (Weingart, 1995). The process of the technology assessment of some hospitals also lack proper structure and some hospitals also lacked official strategic plan (Weingart, 1995). The unavailability of information has also been reported to impede health technology assessment processes and hence impedes the effect of HTA (Bodeau-Livinec *et al.*, 2006). Bodeau-Livinec *et al.* (2006) mentioned time taken to complete investigative procedures, poor knowledge of recommendations, and recommendations becoming obsolete as a result of developments in knowledge and technology. These authors also stressed that some respondents felt that the HTA unit (CEDIT) was too closely connected with decision-making departments (Bodeau-Livinec *et al.*, 2006). In the HTA process many technologies are often rejected for a number of reasons including failure to identify administrative responsibility to carry this out, lack of funds, complex administrative changes, technology already implanted, technology which would potentially render the hospital vulnerable to legal action (McGregor, 2012). Schumacher and Zechmeister (2013) therefore have reported

awareness and acceptance as key or critical factors in the implementation process of HTA.

Furthermore, the level of application of HTA in many developing settings constrained by resources is extremely low to non-existence. Thus, decision on the acquisition of health technologies are highly subjective and expert based rather than research based (Abaza & Tawfik; 2008; Mathew, 2011). The existing barrier in developing countries is largely attributed to shortage of technical expertise and health service capacity to utilize cost-effective analysis information and the existence of management information gap (Hutubessy *et al.*, 2003).



CHAPTER THREE

RESEARCH METHODOLOGY

The methods and methodologies employed in the chapter are examined. The thematic areas of research methodology examined in the chapter included the research design, the population of the study, the sample size calculation, the sampling method, the data collection method and instruments, administration of the data collection instruments, pilot-study, data processing and analysis, validity and reliability and ethical consideration of the study.

3.1 Research Design

The current study is underpinned on the mixed method approach to research. The preference of this approach is based on the phenomenological philosophy and the inductive nature of the research. Moreover, the study gathers data from both qualitative (interview) and quantitative (questionnaire) methods. The increasing prominence of the mixed method is due to the allowance for simultaneous usage of quantitative and qualitative approaches (Zohrabi, 2013). The fundamental principle of mixed methods research is that multiple kinds of data should be collected with different strategies and methods in ways that reflect complementary strengths and non-overlapping weaknesses (Johnson & Turner, 2003). This method emerged from the constant debate between qualitative and quantitative approach in research studies.

The mixed method approach is traced to the multi-trait, multi-method approach of Campbell and Fiske (1959, cited in Teddlie & Tashakkori, 2009).

3.1.1 Research Strategy

The study employs both the case study research strategy and the inductive strategy. The case study strategy is necessary in this circumstance to collect in-depth information on the health technology assessment practices of the Komfo Anokye

Teaching Hospital in Kumasi in the Ashanti region. Case study has been defined as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Robson, 2002:178). This therefore fits into the current study as the phenomenon under investigation in its real-life context, health technology assessment at KATH is been carried out through the collection of information using interview and questionnaire. The inductive strategy was also adopted since the study moves from the specific to general. The inductive strategy involves the “„bottom-up“ method, which involves using the participants“ views to build broader themes and generate a theory interconnecting the themes” (Creswell & Plano Clark, 2007:23).

3.1.2 Research Philosophy

The current study is underpinned on the phenomenological philosophy of research. This choice is based on the fact that the study largely defines human phenomenon within the everyday social contexts in which the phenomena occur from the perspective of those who experience them (Titchen & Hobson, 2005). The study seeks to understand the phenomenon of health technology acquisition process of KATH. The current study explores the process and method of health technology evaluation before acquisition at KATH and so perfectly fits into the phenomenological philosophy as this approach primarily focuses on exploring human experiences of a phenomenon.

3.2 Population of the study

The entire group of individuals or objects to which researchers are interested in generalizing the conclusions defines the target population (Perneger *et al.*, 2014). However, under circumstances of barriers in accessing all members of the target population, the accessible group is termed as the study or research population (Kumar, 2008). The population of the study was made up of health managers, policy makers, administrative and management staff at both the micro and macro levels of health care decision making in Ghana. The distribution of the research population is provided in Table 3.1.

Table 3.1: Distribution of the population by category

Category	Research Population
Policy makers	12
Health administrators	30
Management Staff Other	80
health staff	24
Total	146

Source: Field Survey (2017)

3.3 Sample size

The sample size for the current study of 107 participants from the health sector in Ghana was calculated using the two-stage sample size derivation formula method. The first stage involved the calculation of the sample size for the entire target population and the second stage involved the calculation of the sample for each category or sub-groups. The efficient or effective minimum sample size for the entire target population was derived through the De Vaus (2002) sample proportion formula. The step that followed was the derivation of the sub-group or category sample sizes using the Krecjie and Morgan formula developed in the 1970.

N 146 146 146

$$n = 1 + \frac{N^2}{n} \left(\frac{Z^2}{2} + 1 \right) \left(\frac{0.05}{2} \right) \left(1 + 0.365 + 1.365 \right) = 107 \text{ Participants}$$

where; n = Sample Size

N = Target Population

Z = Margin of error

The Krecjie and Morgan (1970) formula for the calculation of the sub-sample size of the two categories is presented below.

$$s = \frac{XS}{P}$$

s = Sub-sample size for each category
 X = Population of employees in each category
 S = Total sample size for the study
 P = Total population of the categories of staff

The non-response rate was accounted for through the addition of 10% of the calculated sample size during the administration of the questionnaires. Therefore, the calculated sample size of 107 was increased by 11 to obtain 118 target participants of the survey. The increment was also essential to account for spoiled questionnaire and uncompleted ones. The distribution of the actual calculated sample size for the two groups of staff is shown in Table 3.2.

Table 3.2: Sample Size Distribution

Category	Research Population	XS/P	Sample Size
Policy makers	12	12(93)/122	9
Health Administrators	30	30(93)/122	22
Management Staff Other	80	80(93)/122	59
Health Staff	24		17
Total	146	146(107)/146	107

Source: Field Survey (2017)

3.4 Sampling Procedure

The administrators and management staff were sampled through a multistage sampling procedure involving stratified sampling, simple random sampling by balloting procedure and purposive sampling method. In the first stage of the multistage sampling procedure, the three categories of participants provided the basis for stratification of the participants through a stratified sampling procedure. Thus, the three participant categories (Policy makers, Health administrators & Management staff) constituted the layers or stratum. This method was necessary at this stage since the participants were heterogeneous in character. The stratification thus ensures fair representation from each sub-group.

In the second stage, the health managers and administrative staff were sampled through a simple random sampling by lottery method or fishbowl draw method was employed in the selection of members from each category of the target population. This method involved the representation of each unit of member of a category by a slip of paper. The slips of papers were put in a container or a box and shuffled and slip pulled out till the required number of members for each category was met. In the third stage of the multistage sampling procedure, a purpose sampling procedure was employed in the selection of the policy makers. Heads of the policy making institutions and persons in the institutions directly involved in health decision making, especially concerning technology adoption and all forms of procurement were considered for the study.

3.5 Data Collection Method and Instruments

This section of the chapter discusses the data type collected, the data collection methods and the data collection instruments employed in the study.

3.5.1 Data Type

The study relied on both primary and secondary data. The primary data was sought on issues related to the process and method of health technology (HT) evaluation before acquisition in the health sector in Ghana, the factors affecting HTA implementation and the bodies, decision-makers and other stakeholders involved in HT acquisition. The secondary data was principally information collected through documentary analysis.

3.5.2 Questionnaire

A questionnaire is a set of questions for gathering information from the sample of a population of a study. A semi-structured questionnaire composing of both closed and open-ended questions were designed and administered to the selected health administrative and management staff. The semi-structured questionnaire format was employed to combine the advantages of both the closed-ended and open-ended question formats. The open-ended format allowed for exploration of the range of possible issues relating to the process and method of health technology (HT) evaluation before acquisition and the potential usage of HTA in the health sector. The closed-ended format was also necessary to capture information on factors influencing HTA implementation in the health sector. The closed question formats employed included multiple response, binary and likert scaling methods. Both face-to-face and self-administration methods of administration were employed to reduce the level of inconvenience to respondents.

The questionnaire was in four parts. The part A of the questionnaire measured or examined the socio-demographic characteristics of the respondents. The key variables

considered in the section were age, gender, working experience, educational level etc. The second section or part B of the questionnaire also solicited for information on the process and method of health technology (HT) evaluation before acquisition. The third section or part C of the questionnaire also employed statements and items to measure the factors affecting the HTA implementation in the health sector in Ghana. The fourth section, part D also solicited for information on the potentials of HTA implementation in the health sector in Ghana.

3.5.3 Interview

Face-to-face interview was conducted with the selected policy makers at the Ghana Ministry of Health. Semi-structured interview involves collection information through pre-determined set of questions and possible identification of issues excluded from the pre-determined questions (Dawson, 2002). It is characterised by its flexibility in which the researcher can add or remove questions from the schedule based on the results of each interview (Saunders *et al.*, 2003). Notwithstanding the labour intensive nature of face-to-face interviews, is an appropriate way of achieving higher level of quality data. The type of interview administered to the head of the committee was semi-structured interview. The face-to-face method is necessary due to the impersonal nature of the demanded information and the higher probability of unreturned interview document carried out through post.

The semi-structured interview was in two parts. The first part of the semi-structured solicited for information on the socio-demography of the interviewee. The second part of the semi-structured interview designed encompassed the research questions. Thus, the second part covered thematic areas such as the process and method of health technology (HT) evaluation before acquisition, the factors affecting HTA

implementation, the potential areas of usage of HTA in healthcare and the bodies, decision-makers and other stakeholders involved in HT acquisition in the health sector in Ghana.

3.5.4 Administration of Research Instruments

The researcher began the questionnaire administration by sending several documents including a cover letter, a sample of the questionnaire and the interview guide and a letter explaining the purpose and goals of the study and its significance to policy to the authorities of the selected health institutions. The questionnaire administration took two formats including both face-to-face interview and also leaving the questionnaires with the respondents to be taken in an agreed date. However, the interview was conducted with the selected policy makers at the Ghana Ministry of Health sector in Ghana through the face-to-face method. The administration of the questionnaire with the 22 health administrators and 59 management staff took a week to complete. The administration of the questionnaire took an average of 13 minutes with each member of the procurement staff selected for the study. In the subsequent week, the researcher continued the administration of the questionnaires with 22 members of the committee for evaluating HT before acquisition. The administration of the questionnaires with this group took a week, and encompassed 14 minutes with each member of the group. The questionnaire administration therefore took two weeks to complete and encompassed an average of 13.5 minutes with each participant. The interview with the policy makers also took 30 minutes to complete. The interview with the policy makers also took 30 minutes to complete. Questionnaires were also administered to other 17 staff. From the total 118 questionnaires administered to the participants of the study, 107 had complete information. The partially filled questionnaires were discarded and excluded from the

study and hence produced a response rate of 91%. However, 107 of the completed questionnaires administered to the health administrators and the management staff were considered for the analysis.

3.6 Pilot-Study

The research methods and instruments were pilot-tested on 26 staff of the South Suntreso Hospital in the Kumasi metropolis. An interview was also conducted with the head of administration on issues relating to the evaluation of HT acquisition. The sample size for the pilot-test is justified by the report of Baker (1994) that indicated that 10% to 20% of the actual sample size is a reasonable number for a pilot study.

The pilot study took an average of 20 minutes with each member or participant. Factors that contributed to the longer average time of administration were redressed through rewording and rephrasing.

3.7 Data Processing and Analysis

The information obtain through the interview was analysed using content analytical method. Content analysis is used to reduce the volume of raw data, to identify themes and patterns and organise the information into a compact form without losing any information content. There are several procedural suggestions for content analysis but no systematic rules exist. However, the used analysis approach should be systematic and transparent. The data analysis started with a review of the field notes to develop an initial coding scheme. In case of unclear field notes, the interview tapes were listened again to supplement the notes. The coding was used to identify themes arising from the interview data. In parallel with this, a semi-structured interview guide was used to discover linkages between the theory and the interview data.

However, the information from the questionnaire was analysed through descriptive and inferential analytical methods. The descriptive methods involved were frequency, percentages, mean and standard deviation. The inferential method involved was multiple regression for identifying the factors affecting the practice of HTA, all at 95% confidence interval. The variables for the inferential analysis included the usage or non-usage (dependent variable), knowledge on HTA and price, availability of alternative(s), emerging pathogens and other disease, financial incentives, malpractice avoidance, provider competition, public demand, value for money and quality of life (Incentives and disincentives for using HTA). The constructs for the descriptive analysis included knowledge on HTA, Incentives and disincentives for using HTA and areas of usage of HTA. A documentary analysis was also carried out on the process and methods of evaluating health technology before acquisition.

3.8 Validity and Reliability

The reliability of a research is a measure of the consistency and replicability over time and instrument items (Bajpai & Bajpai, 2014). The goodness of measures of the study is therefore examined through reliability (Sekaran & Bougie, 2010). The reliability of the questionnaire was examined through a pilot-test. The content reliability of the instruments was ensured through consultation with professionals and experts in the field of health and health technology evaluation before purchase. The interview with the chairman of the committee of technology evaluation was recorded to avoid any form of mistake and biases in the transcription. The wording of the questions was properly structured and rephrased to ensure clarity and also asked in natural tone of voice. The researcher repeated all questions of the interview guide in cases of misunderstanding.

The interviewee was also accorded the opportunity to expatiate his beliefs and thoughts freely without any intervention.

Validity refers to the ability of the research instruments to measure what they intend measuring (Ritchie & Lewis, 2003). Validity for the current study was initially ensured through triangulation of data collection method in solving the problem under consideration. Both the interview and questionnaire methods were employed in collecting data for analyzing the problem. The interviews and questionnaire questions constructed were directly related to the research questions and objectives. The transcription of the interview data was done with higher level of accuracy and carried out with the assistance of a post-graduate student in English. The collated secondary data were also initially examined for validity. After the pilot-test, some items of the questionnaire were re-worded and rephrased for higher level of validity.

3.9 Ethical Consideration

The researcher began the research by seeking for the authorization of the supervisor and the clearance of the Ethical Board. The researcher further sought for the authorization of the head of administration at KATH, the chairman of the Committee for Health Technology Evaluation and the other members as well as the members selected from the procurement department for their inclusion in the research study.

The purpose and significance of the study to their organisation, policy and to the researcher was vividly explained. The research also avoided asking questions participants deemed too personal, sensitive and confidential. The research also upheld the scientific honesty of research studies by avoiding falsification of data.

CHAPTER FOUR

RESULTS

This chapter covers the presentation and analyses of the data of the study. The thematic areas discussed were the socio-demographic data of the respondents, the knowledge level of health managers on HTA, the existence of HTA policy framework in the health facilities and the decision making mechanism for health delivery. The other areas also discussed in this section were the effect of decision making policies on health outcomes, the incentives and disincentives for using HTA in healthcare decision making, and the areas of usage of HTA in healthcare. The last section of the chapter reviews and presents the interview result.

4.1 Socio-Demographic Data of Respondents

This section of the study examines the distribution of the respondents in terms of their socio-demographic characteristics. The socio-demographic characteristics were gender, age group, highest educational qualification of the respondents, years of working in the health sector, department and occupation of the respondents. The result on the respondent's socio-demographic characteristics is presented in Table 4.1.

Table 4.1: Socio-Demographic Data of Respondents

Variables	Category	Frequency (n=107)	Percent
Gender	Male	67	62.2
	Female	40	37.8
Age Group	20-30	14	13.3
	31-40	50	46.9
	41-50	24	22.4
	> 50	19	17.3
Education	Diploma/HND	8	7.7

	First Degree	50	47.1
	Master's Degree	45	42.3
	PhD	3	2.9
Years in the Health Sector			
	1-5	14	13.5
	6-10	40	37.8
	11-15	21	19.4
	16-20	17	15.5
	> 20	15	13.7
Department			
	Pharmacy	39	36.4
	Administration	7	6.5
	General Stores	4	3.7
	Biomedical Engineering	2	1.9
	Child Health	2	1.9
	Emergency Medicine	2	1.9
	Ghana Health Service	2	1.9
	Human Resources	2	1.9
	Internal Medicine Pharmacy	2	1.9
	Management	2	1.9
	Nursing Administration	2	1.9
	Others	41	38.3
Occupation			
	Pharmacist	51	47.7
	Health Service Administrator	9	8.4
	Nursing	5	4.7
	Assistance Supply Officer	4	3.7
	Procurement Manager	4	3.7
	Medical Doctor	3	2.8
	Accountant	2	1.9
	Others	29	27.1

Source: Field Survey (2018)

Table 4.1 shows that, the majority (62.8%) of the surveyed health professionals were males whereas 37.8% were females. The age distribution showed that the majority were in the age group of 31 and 50 years. Thus, the health professionals surveyed were largely part of the active working and active population of Ghana. The distribution of the respondents by their highest level of education showed that 47.1% had diploma or high national diploma, and 42.3% had first degrees in various health professions. The surveyed respondents were

majorly (36.4%) in the pharmacy department, 6.5% were in the administrative departments of the hospitals and 3.7% were in the general store departments. The respondents were also selected from other departments like Biomedical Engineering, Child Health, Emergency Medicine, Ghana Health Service, Human Resources, Internal Medicine Pharmacy, Management, and Nursing Administration, all in the health sector. Table 4.1 shows that 13.5% have been in the health sector for 1 to 5 years, 37.8% have been in the health sector for 6 to 10 years, 19.4% have been in the health sector for 11 to 15 years, 15.5% have been in the sector for 16 to 20 years and 13.7% have also been in the health sector for more than 20 years. This result implies that the respondents have been with the health sector for several years and have adequate experience in the sector to assist in providing adequate information on HTA practices in the health sector. The largest proportions of the surveyed respondent were Pharmacist, 5.6% were health service administrators, 4.7% were nurses and 3.7% were assistant supply officers. Other professionals in the health sector surveyed were procurement managers, medical doctors, accountants etc.

4.2 Knowledge Level of Healthcare Managers on HTA

This section of the study examines the level of knowledge of the health facility managers on HTA. The section first examined the received training on HTA and then the manager's level of knowledge on HTA. The result is presented in Table 4.2 and Table 4.3.

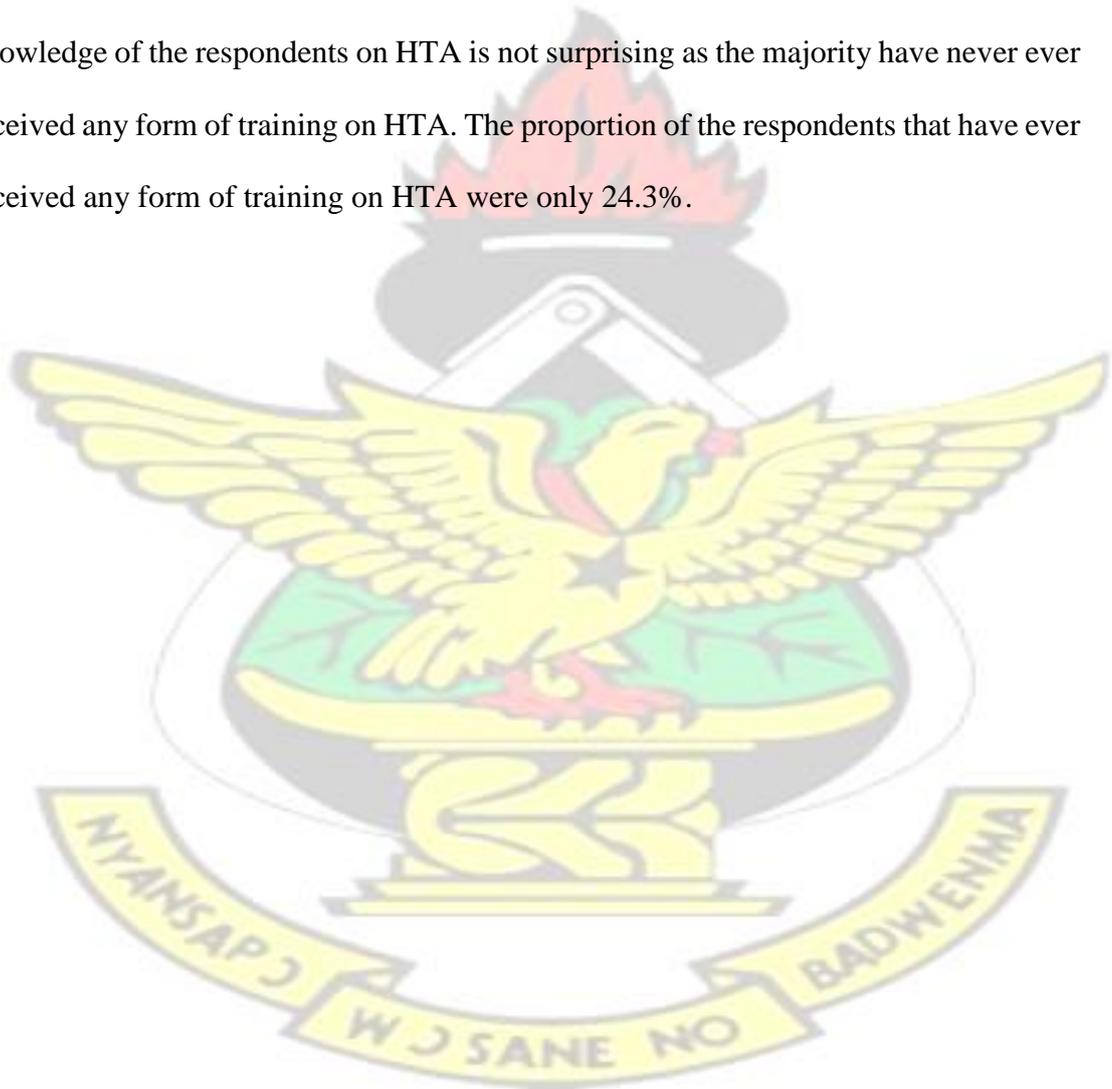
Table 4.2: Training and Knowledge on HTA

Variables	Category	Frequency	Percent
Ever had any Training on HTA	Yes	26	24.3
	No	81	75.7
Total		107	100.0
Level of Knowledge about HTA	Don't Know	6	6.3
	Very Low	28	29.5
	Low	40	42.1
	High	18	18.9

	Very High	3	3.2
Total		95	100.0

Source: Field Survey (2018)

Table 4.2 shows that the level of knowledge of the healthcare professionals was low. The distribution of the respondents showed that 29.5% have very low level of knowledge on HTA, 42.1% have low level of knowledge on HTA, 18.9% have high knowledge level on HTA and 3.2 have very high knowledge on HTA. The low level of knowledge of the respondents on HTA is not surprising as the majority have never ever received any form of training on HTA. The proportion of the respondents that have ever received any form of training on HTA were only 24.3%.



3: Knowledge on HTA usage in the Health Sector

Variables	N	Min	Max	Mean	SD
HTA provides decision makers with information about the possible impacts and consequences of a new technology	104	1	5	4.08	.78
HTA provides decision makers with information about the significant change in an old technology	103	2	5	4.12	.72
HTA involves reportage on safety, efficacy, feasibility and cost-effectiveness of health technologies	104	2	5	4.11	.78
HTA application is essential for positive healthcare outcomes	104	3	5	4.30	.68
HTA is important in informing policymaking for technology in health care	104	1	5	4.24	.82
Valid N (listwise)	103				

Rank: [Strongly Disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly Agree = 5]

Source: Field Survey (2018)

Table 4.3 shows that the respondents were aware that HTA provides decision makers in the health sector with information about the possible impacts and consequences of a new technology (Mean = 4.08, SD = .78). The respondents also agreed that HTA provides decision makers in the health sector with information about the significant change in an old technology and hence the need to acquire more modern ones (Mean = 4.12, SD = .72). The surveyed health professionals also agreed that HTA involves reportage on safety, efficacy, feasibility and cost-effectiveness of health technologies (Mean = 4.11, SD = .78). The healthcare professionals further perceived that HTA application is essential for positive healthcare outcomes (Mean = 4.30, SD = .68). HTA is also perceived important in informing policy-making in the areas of healthcare technology (Mean = 4.24, SD = .82).

Table 4.

4.3 Existing Policies or Framework of HTA in the Health System

This section of the study examines the existence of HTA framework or policy in the health facilities and whether HTA implementation is necessary. The result is presented in Table 4.4.

Table 4.4: The Existence of Policy on HTA

Variables	Category	Frequency	Percent
Are there policies or framework on HTA in this facility?	Yes	37	37.0
	No	63	63.0
	Total		100
Does Ghana need policy on HTA?	Yes	99	96.1
	No	4	3.9
	Total		103

Source: Field Survey (2018)

Table 4.4 shows that, the majority (63.0%) of the respondents believe that there is no policy framework on HTA in the health facilities in Ghana whereas 37.0% believed otherwise. Nonetheless, the respondents largely believe that Ghana needs a policy framework on HTA to guide the procedures, processes and strategies of the health sector.

4.4 Decision Making Mechanisms for Health Delivery

The decision making mechanisms employed by the various health facilities in Kumasi in healthcare delivery are examined in this section of the study. The section also looks at the effect and rate of the effect of decision making policies on health outcomes in the health facilities. The results are presented in Tables 4.5, 4.6 and 4.7.

5: Basis for Decision Making in Procurement in the Health Sector

	Frequency	Percent	Valid Percent
Effectiveness	3	2.8	2.9
Cost-benefits	7	6.5	6.8
Efficacy	4	3.7	3.9
Safety	2	1.9	1.9
None of the Above	3	2.8	2.9
All of the above	84	78.5	81.6
Total	103	96.3	100.0

Source: Field Survey (2018)

Table 4.5 shows that the majority (81.6%) of the respondents believe that several factors like effectiveness, cost-benefits, efficacy and safety of the activities in the health sector form the base for decision making in the health sector in the process of procurement and usage of health technologies.

Table 4.6: Rate of Effect of Decision Making Policies on Health Outcomes

Rate	Frequency	Percent	Valid Percent
Very High	27	25.2	26.7
High	41	38.3	40.6
Don't Know	14	13.1	13.9
Poor	15	14.0	14.9
Very Poor	4	3.7	4.0
Total	101	94.4	100.0

Source: Field Survey (2018)

Table 4.6 shows that the respondents largely agreed that decision making policies or frameworks in the health sector have high effect on health outcomes. The distribution of the respondents showed that 26.7% and 40.6% perceived the effect of decision making policies or framework on healthcare delivery as very high and high respectively. However, 14.9% and 4.0% also perceived the effect of decision making policies or framework on healthcare delivery as poor and very poor respectively.

Table 4.**7: Effect of Decision Making Policies on Health Outcomes**

Variables	N	Min	Max	Mean	SD
Patient Recovery time	103	1	4	2.94	.81
Patient survival	104	1	4	3.04	.85
Deliveries	101	1	4	2.99	.85
Reduction in Errors	104	1	4	2.92	.94
Quick delivery of Service	104	1	4	2.86	.98
Valid N (listwise)	101				

Rating: [No Effect = 1, Low Effect = 2, High Effect = 3, Very High Effect = 4] Source: Field Survey (2018)

Table 4.7 shows that the respondents agreed that the effect of decision making policies have high effect on patient recovery time (Mean = 2.94, SD = .81). The respondents also agreed that decision making policies in the health sector have high effect on the survival of patients (Mean = 3.04, SD = .85). The respondents also agreed that decision making frameworks or policies like HTA have high effect on birth deliveries in the health sector (Mean = 2.99, SD = .85). The availability of decision making policy in the health facilities in Ghana is also perceived to have high effect on error reduction and quick delivery of services as indicated by the approximate mean response value of 3.00.

4.5 Incentives and Disincentives for Using HTA in Healthcare Decision Making

The incentives and disincentives for the usage of HTA in healthcare decision making in Ghana are identified in this section of the study. Analyses were performed using both descriptive statistics and Kendall's Rank Test. The Kendall's Rank Test carried out to rank their order of relevance to the health managers. The result is presented in Tables 4.8 and 4.9.

8: HTA Usage in Decision Making at the Health Sector

Use HTA in Decision Making Category	Frequency	Percent	Valid Percent
Yes	29	27.1	28.7

	No	72	67.3	71.3
Total		101	94.4	100.0

Source: Field Survey (2018)

Table 4.8 shows that the majority (71.3%) of the respondents believed that HTA is not used in the decision making process in the health sector in Ghana. The respondents therefore generally asserted the absence of HTA in the decision making process in the various health facilities in Ghana.

Table 4.9: Incentives and Disincentives for HTA Usage in the Health Sector

Factors	Descriptive Statics					Kendall's Rank Test	
	N	Min	Max	Mean	SD	Mean Rank	Rank
Incentives							
Value for money	103	1	5	4.10	1.04	6.60	1 st
Quality of life	103	1	5	4.10	.98	6.50	2 nd
Price	103	1	5	3.99	.92	6.15	3 rd
Emerging pathogens	96	1	5	3.72	1.11	5.39	4 th
Malpractice avoidance	103	1	5	3.67	1.18	5.27	5 th
Availability of Alternatives	99	1	5	3.71	.90	5.18	6 th
Financial incentives	98	1	5	3.57	1.23	5.17	7 th
Provider competition	97	1	5	3.58	1.10	4.99	8 th
Public demand	99	1	5	3.58	1.20	4.92	9 th
Third Party payment	97	1	5	3.58	.95	4.82	10 th
Disincentives							
Inadequate expertise	97	1	5	4.00	1.07	4.37	1 st
Internal politics ignorance	93	1	5	3.97	1.13	4.18	2 nd
Lack of funds	96	1	5	3.71	1.26	4.04	3 rd
Complex administrative charges	96	1	5	3.83	1.03	4.01	4 th
Lack official strategic plan	97	1	5	3.76	1.05	3.98	5 th
Unavailability of information	95	1	5	3.64	1.22	3.73	6 th
Lack proper structure	96	1	5	3.72	1.16	3.69	7 th
Valid N (listwise)	70						

Rank: [Strongly Disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly Agree = 5]

Source: Field Survey (2018)

Table 4.9 shows that the respondents agreed to value of money for procured technologies as key incentive for HTA usage in the health sector (Mean = 4.10, SD

Table 4.

=1.04). Quality of life is also perceived among the surveyed health professionals as an incentive for HTA usage in the health sector (Mean = 4.10, SD =.98). The prices of goods and services to be procured in the health sector also form prime incentive for HTA usage in the health sector (Mean = 3.99, SD =1.11). The respondents also agreed that emerging pathogens provide strong incentives for the usage of HTA in the health sector (Mean = 3.72, SD =1.04). The need to prevent all forms of malpractice in the procurement of health facilities and technologies serves as strong incentive for the usage of HTA in the health sector (Mean = 3.67, SD =1.18). The availability of alternative technologies and health facilities provides the basis for the usage of HTA in decision making in the health sector (Mean = 3.57, SD = .90). The other perceived incentives for the usage of HTA in decision making in the health sector were financial incentives, provider competition, public demand and third part payment as indicated by the mean response value of approximately 4.00.

The Kendall's rank test of the Table 4.9 shows that the most highly rated incentive for the usage of HTA in decision making in the health sector is perceived as „value for money“ with the highest mean rank of 6.60. The second and third ranked factors behind the need for using HTA in decision making in the health sector were „quality of life“ and „price“ as shown by the mean rank values of 6.50 and 6.15 respectively. The fourth and fifth ranked incentives for the usage of HTA in decision making in the health sector as perceived by the surveyed health professionals were „emerging pathogens“ and „avoidance of malpractices“ with mean ranks of 5.39 and 5.27 respectively. The least ranked incentive for the usage of HTA in decision making in the health sector was third party payment with mean rank of 4.82. The Kendall's rank test statistics result shows

of Table 4.10 shows that the null hypothesis of no agreement between the respondents in terms of the order of ranking of the incentive

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factors was rejected at a statistical significance level of 1 percent ($\chi=155.598$, $P < .01$). This therefore implies that the respondents agreed to the order of ranking of the incentives for the usage of HTA in the health sector. The order of ranking of the factors is provided in Table 4.9.

Table 4.9 shows that the inadequacy of expertise of the healthcare professionals is an impediment or disincentive to the usage of HTA in many health facilities (Mean = 4.00, SD = 1.07). The internal politics ignorance of many health facilities presents difficulty or serve as an incentive in the adoption of HTA in the decision making process of the facilities (Mean = 3.97, SD = 1.13). The challenge of inadequate funds due inadequate budgetary allocation and poor internal revenue generation capacity of healthcare facilities constitute disincentive for the usage of HTA in decision making in the health sector (Mean = 3.71, SD = 1.26). The other factors that were also perceived as disincentives to the usage or adoption of HTA in decision making in the health sector were the complexity of administrative charges, lack of official strategic plan, unavailability of information and lack of proper structures as indicated by the approximate mean value of 4.00.

The Kendall's rank test of the Table 4.9 shows that the most highly rated disincentive for the usage of HTA in decision making in the health sector is perceived as „the inadequacy of expertise“ with the highest mean rank of 4.37. The second and third ranked disincentives or barriers to the usage of HTA in decision making in the health sector were „internal politics ignorance“ and „lack of fund“ as shown by the mean rank values of 4.18 and 4.04 respectively. The fourth and fifth ranked disincentives for the usage of HTA in decision making in the health sector as perceived by the surveyed

health professionals were „the complexity of administrative charges“ and „lack of official strategic plan“ with mean ranks of 4.01 and 3.98 respectively. The least ranked disincentive for the usage of HTA in decision making in the health sector was lack of proper institutional structure with mean rank of 3.69. Table 4.10 shows that the Kendall’s rank test statistics result also shows that the null hypothesis of no agreement between the respondents in terms of the order of ranking of the disincentive factors was rejected at a statistical significance level of 1 percent ($\chi=120.431$, $P < .01$). This therefore implies that the respondents agreed to the order of ranking of the disincentives for the usage of HTA in the health sector. The order of ranking of the factors is provided in Table 4.9.

Table 4.10: Kendall’s Rank Test Statistics

<u>Test Statistics</u>	<u>Incentive Factors</u>	<u>Disincentive Factors</u>
N	84	80
Kendall's W ^a	.874	.722
Chi-Square	155.598	120.431
Df	9	6
Asymp. Sig.	.000	.000

a. Kendall's Coefficient of Concordance

Source: Field Survey (2018)

4.6 Areas of Usage of HTA in Healthcare

This section of the study identifies the areas in healthcare in the health facilities that embraces the HTA in the decision making process. The result is presented in Table 4.11.

Table 4.11: Areas of HTA usage In Healthcare

<u>Areas</u>	<u>N</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>SD</u>
Drugs	100	1	5	2.72	1.28
Biologics	91	1	5	2.46	1.19

Devices Equipment supplies	95	1	5	2.47	1.25
Medical Surgical procedures	96	1	5	2.60	1.26
Support system	90	1	5	2.41	1.17
Organizational managerial	93	1	5	2.41	1.20
Others	23	1	4	1.65	1.02
Valid N (listwise)	22				

Rating: [Never used = 1, Sometimes Used = 2, Occasionally Used =3, Frequently Used =4]

Source: Field Survey (2018)

Table 4.11 shows that HTA is occasionally used in decision making concerning drugs (Mean = 2.72, SD = 1.28). The respondents also agreed that HTA is occasionally used in medical surgical procedures in the health sector in Ghana (Mean = 2.60, SD = 1.26). Nonetheless, the respondents also agreed that HTA is sometimes used in the areas of biologics, devices equipment supplies, support system and organizational managerial functions as indicated by the mean response value of approximately 2.00.

4.7 Univariate and Multivariate Regression

This section of the study provides information on the incentives and disincentives for the usage of HTA in decision making in the various hospitals in Ghana. The factors were analysed using both univariate and multivariate binary logistic regression method. The univariate analysis is assumed crude as the models are unadjusted for the effects of other independent variables whereas the multivariate analysis defined as adjusted accounts for the effect of the other independent variables. The Pseudo RSquare of the adjusted model or the multivariate logistic regression of 0.2596 indicates that about 26 percent of the variation in the decision to use or not use HTA in the health sector is explained by the factors considered in the model. The hosmerLemeshow test also produced a probability value greater than 0.05 and hence provide evidence of good-fit of the estimated multivariate model. The Table 4.12 provides all information in the

estimated univariate models and the multivariate model. The Likert scale categories were grouped into two categories (Yes (Strongly Agree (5) & Agree (4)) and No (Strongly Disagree (1) & Disagree) (2)). The uncertainty category was ignored. Thus, the categories of the variables in Table 4.12 were binary (Yes = 0, No = 1). The „No“ categories were employed as reference point in each case of the variables in the Table 4.12.

Table 4.12 shows that emerging pathogens is perceived as statistically significant incentive for the decision to use HTA in the health sector (OR = 2.31, $P < .01$). This implies that the potential increase in emerging pathogens is positively associated with 2.31 odds of using HTA in the health sector. Third party payment was also found to be a positive incentive for the decision to use HTA in the health sector in Ghana (OR = 1.96, $P < .01$). Thus, increasing element of third party payment is associated with 1.96 odds of using HTA in decision making in the health sector in Ghana. Financial factor was also found to be a positive incentive for the decision to use HTA in the health sector in Ghana (OR = 1.81, $P < .01$). Thus, increasing financial incentives is associated with 1.81 odds of using HTA in decision making in the health sector in Ghana. Malpractice avoidance was also found to be a positive incentive for the decision to use HTA in the health sector in Ghana (OR = 1.64, $P < .01$). Thus, increasing incentive to avoid malpractice is associated with 1.64 odds of using HTA in decision making in the health sector in Ghana.

Table 4.12: Binary Logistic Regression Models

Variables	Crude ^b				Adjusted ^{a,d}			
	OR	CI	Z	P> z	OR	CI	z	P> z
Incentives Price								
	1.16	.87-1.55	1.01	0.314	.70	.38-1.30	-1.12	0.261
Availability of alternatives	1.22	.90-1.65	1.29	0.196	1.11	.51-2.41	0.27	0.786
Emerging Pathogens	1.34	1.05-1.71	2.38	0.017	2.31	1.61-3.30	4.55	0.000
Third party payment	2.41	1.79-3.33	5.29	0.000	1.96	1.30-2.96	3.21	0.001
Financial Incentives	1.66	1.33-2.07	4.47	0.000	1.81	1.23-2.66	3.00	0.003
Malpractice avoidance	1.22	.98-1.51	1.77	0.077	1.64	1.19-2.25	3.04	0.002
Provider competition	.89	.68-1.15	-0.89	0.375	.64	.36-1.17	-1.45	0.146
Public demand	1.19	.96-1.48	1.59	0.112	.89	.60-1.32	-0.59	0.557
Value for money	1.15	.90-1.47	1.14	0.256	.98	.51-1.85	-0.08	0.937
Quality of life	1.25	.96-1.62	1.67	0.095	.98	.54-1.78	-0.07	0.941
Disincentives								
Internal politics ignorance	1.59	1.23-2.05	3.57	0.000	.51	.32-.83	-2.75	0.006
Inadequate expertise	1.98	1.51-2.58	5.00	0.000	1.85	1.06-3.23	-2.16	0.031
Lack of proper structure	1.63	1.28-2.08	3.95	0.000	.31	.15-.65	-3.13	0.002
Lack of official strategic plan	1.24	.94-1.62	1.57	0.116	1.27	.75-2.15	0.88	0.376
Unavailability of information	1.65	1.31-2.08	4.29	0.000	.52	.29-.95	-2.15	0.032
Lack of funds	1.62	1.29-2.03	4.14	0.000	1.50	.84-2.68	1.38	0.167
Complex administrative changes	2.23	1.65-3.02	5.21	0.000	.13	0.02-.82	-2.18	0.030
_cons					.09	.01-1.09	-1.89	0.058
Diagnostic test (Adjusted) ^a LR								
Chi² (17)						86.96		
Prob< Chi²						0.0000		
Pseudo R²						0.2596		
Log Likelihood						-124.00266		

Dependent Variable: HTA Usage in Decision Making

95% CI = 95% confidence interval. ^a Adjusted for the effects of the other independent variables.

^b Unadjusted for the effects of other independent variables. ^c Reference category. ^dHosmer-Lemeshow test. p-value > 0.05.

Source: Field Survey (2018)



Table 4.12 also shows that internal politics ignorance was statistically and significantly negatively associated with the usage of HTA in the health sector in decision making (OR = .51, P < .01). Thus, increasing internal politics ignorance increases the incentive of using HTA in decision making in the health sector by the odds of 0.51. Inadequacy of expertise on HTA has negative and significant association with the usage of HTA in decision making in the health sector in Ghana (OR = 1.85, P < .05). Thus, the inadequacy of expertise in HTA has the potency to reduce the odds of using HTA in decision making in the health sector by 1.85. Lack of proper structures in the health sector has negative and significant association with the usage of HTA in decision making in the health sector in Ghana (OR = .31, P < .01). Thus, the inadequacy of proper structures in the health sector reduces the odds of using HTA in decision making in the health sector by 0.31. The unavailability of information in the health sector has negative and significant association with the usage of HTA in decision making in the health sector in Ghana (OR = .52, P < .05). Thus, the unavailability of information in the health sector reduces the odds of using HTA in decision making in the health sector by 0.52. The complexity of administrative changes in the health sector has negative and significant association with the usage of HTA in decision making in the health sector in Ghana (OR = .13, P < .05). Thus, the complexity of administrative changes in the health sector reduces the odds of using HTA in decision making in the health sector by 0.13.

4.8 Interview Result

This section of the study report the interview conducted with eight administrative staff of three health facilities in Ghana. The interviewee distribution showed that one was from MCHH, five from KATH and one from the Manhyia Hospital. Occupation

distribution of the interviewees showed that the MCHH interviewee was an accountant, the Manhya interviewee was a health administrator, and the interviewees from KATH were largely health administrators. The educational qualification of the interviewees was largely master's degree. The average age of the interviewees was about 50 years and their average working experience in the health sector was about 21 years. Thus, the interviewees were well-equipped in terms of educational qualification and working experience in the health sector to provide information on decision making, the procedures, policies and technologies employed in making decision.

The researcher conducted an interview with the Accountant of MCHH who is the head of the financial department of the institution. This female interviewee of 51 years has 20 years of working experience in the health sector and highest educational qualification of master's degree. The core activities of the interviewee of management of the finances of the facility well-equip her to provide reliable information on HTA practices in the facility. The interviewee is engaged in management level decision making activities in the facility. MCHH according to the interviewee in their decision making process are not guided by any policy or framework on HTA. Thus, the interviewee indicated that decision making in the facility is based on health data information.

The interviewee indicated to have heard about HTA and even perceived it to facilitate decision making. Nonetheless, the interviewee has never been engaged in a decision making process that involved the usage of HTA framework or policy. The interviewee believe that HTA is essential in decision making processes of institutions as the framework makes decision making relatively easier and efficient. The interviewee

however was unable to provide adequate information on the attributes, benefits and weaknesses of the application of HTA framework. The interviewee had no knowledge and experience in the development of evidence-based standard treatment guidelines, selection of the national essential medicine list, selection of national health insurance scheme reimbursement formula, the selection of health services to be covered under the NHIS and the design of the NHIS benefit packages. The experience and knowledge of the interviewee was largely in equipment procurement.

The interviewee indicated that decisions in the health facility are made through periodic management meetings. The responsibility of decision making in the facility lies in the bosom of the management body. According to the interviewee, decision making in the health facility is largely based on quality health care delivery to patients. However, the interviewee indicated that decisions have never been made at MCHH using HTA framework. The interviewee perceives the main incentive for the possible usage of HTA framework in decision making as quality decision making. The Ministry of Health in Ghana was perceived by the interviewee as body to lead the implementation of national HTA framework in Ghana.

The researcher also conducted an interview with a health administrator at the Mahyia Hospital. This male interviewee of 28 years has 2 years of working experience in the health sector and highest educational qualification of first degree. The interviewee served as the administrative manager at the hospital and largely played the role of daily administration and management of the human resource of the hospital. The interviewee is involved in management decision making at the facility. The interviewee indicated that decision making procedures in the facility are not formally guided by HTA.

Nonetheless, the interviewee was aware of HTA and perceived the framework to assist in decision making at more efficient level. The interviewee was involved in HTA related activity less a year ago. The interviewee perceived HTA as relevant in healthcare decision making as it offers clear policies and procedures. The interviewee however perceived the difficulty in managing factors as the main weakness of the HTA framework. The interviewee had no knowledge and experience in the development of evidence-based standard treatment guidelines, selection of the national essential medicine list, selection of national health insurance scheme reimbursement formula, the selection of health services to be covered under the NHIS and the design of the NHIS benefit packages. The experience and knowledge of the interviewee was largely in equipment procurement.

The interviewee indicated that decision making in the facility is done through periodic management meetings. Though decision making in the facility is not formally guided by HTA, the interviewee indicated that decisions have been made by management using HTA. Budget impact analysis and cost-benefit analysis are main HTA activities performed in the facility. According to the interviewee, the incentive for the usage of HTA at the facility is to ensure effective and more efficient decisions. The interviewee believes that managers with clear guidelines on decision making are likely not to use HTA. The usage of HTA is in all health decisions at the facility. The interviewee believes that the implementation of HTA in the health sector should be spearheaded by the Ministry of Health through Regional Health Departments. The interviewee perceived human management as the key challenge of the institutionalization and application of HTA in the facility.

The researcher also conducted an interview with a female health administrator whose is tasked with the responsibilities of the day to day administration of the hospital. This female interviewee of 50 years has 17 years of working experience in the health sector and highest educational qualification of master's degree. The interviewee is directly involved in decision making in the health facility. The interviewee is involved in decision makings concerned with human resource, procurement and NHIS. The health facility of the interviewee is not guided by HTA framework or policy in the decision making process.

The interviewee indicated to have heard of HTA. The interviewee's knowledge on HTA is related to the framework's usage in assessing health technologies to be purchased by the health facility and evaluation of health properties and equipment. Nonetheless, the interviewee has never been involved in decision making based on HTA framework. The interviewee, however, believes that HTA is essential in healthcare decision making, especially in areas such asset registry entries, disposal of assets etc. The interviewed indicated to have knowledge and experience on the development of evidence-based standard treatment guidelines, selection of the national essential medicine list, selection of health services to be covered under the NHIS and equipment procurement.

The interviewee indicated that decisions are made in the health facility through management periodic meetings, research and hospital management committees. The interviewee has ever taken decision reliant on HTA, especially through activities like cost-effective analysis and budget impact analysis in the health facility. The HTA usage in the decision making in the health facility was motivated by the desire to produce a more reliable and effective decision. The interviewee believes that health decisions in

the areas like treatment, NHIS and human resource management should be guided by HTA framework or policy. The interviewee believes that the introduction and application of HTA in the health sector in Ghana should be spearheaded by the Municipalities and District Assemblies in Ghana. The inadequacy of personnel with the technical expertise to implement HTA is perceived as the key challenge by the interviewee.

The researcher also conducted an interview with a Business Manager at KATH tasked with the responsibility of overseeing the day to day administration of assigned departments in the health facility. This male interviewee of 35 years has 8 years of working experience in the health sector and highest educational qualification of master's degree. The interviewee is involved in making decisions on issues related to procurement, human resource, materials, logistics and equipment. The interviewee indicated that the health facility under consideration does not depend on HTA framework or policy in decision making. The interviewee indicated that decisions in the health facility are based on cost effectiveness, cost containment and potential benefits of a decision and alternatives. The interviewee indicated to have heard about HTA and even described it as an approach employed in decision making. Nonetheless, the interviewee has never been involved in decision making that is reliant on HTA policy. The interviewee, however, perceived the HTA policy or framework as relevant in decision making in the health sector as it has the potency to ensure effective and efficient decision making in the health sector. The interviewee indicated that HTA as policy makes decision making easier. Nonetheless, the interviewee indicated that the reliance on the HTA policy limits creativity and initiatives as the policy provides the boundaries of decision making. The interviewee also reported the lack of training

programmes for health professionals on HTA as a weakness in the policy. The experience of the interviewee was largely on equipment procurement.

The interviewee indicated that decision making in the health facility is largely bottomup approach oriented. The decision making process is initiated by patients or users of the facility, and hence form the basis as inputs for central management decisions. Decisions in the health facility are believed to be made by supervisors and heads of departments. Decision making in the health facility is perceived by the interviewee to be based on the user's feedback, the ultimate benefits of the decisions, and the cost effectiveness of the alternatives.

The interviewee has never made decision on the basis of HTA. Nonetheless, the HTA related activities carried out by the health facility of the interviewee are cost-effective analysis, budget impact analysis and policy analysis. The incentives for the usage HTA as perceived by the interviewee are efficiency and effectiveness, and staff competency on HTA. The perceived weakness of HTA framework is the inadequacy of training programmes for staff on HTA. The interviewee believes that the health facility's implementation of HTA policy is largely reliant on the commitment and support of management.

The interviewee indicated that health decisions in areas such as procurement of equipment and logistics, health consultancy, drugs and non-drug consumables, and human resource management should be guided by HTA. The interviewee believes that all health decisions should be guided by HTA framework. The interviewee indicated that the implementation of the HTA framework in Ghana should be spearheaded by the

Ministry of Health. The key challenges to the institutionalization and application of HTA identified by the interviewee were fear of change and inadequacy of training on HTA.

The researcher also conducted an interview with another male hospital administrator at KATH, a deputy director of supply chain management delegated with the role of management of medicines and non-medicinal consumables in the hospital. This male interviewee of 48 years has 22 years of working experience in the health sector and highest educational qualification of master's degree. The interviewee is largely involved in decisions on the procurement of drugs, equipment, non-medical consumables, construction, works and services, consultancy, maintenance, and stores. According to the interviewee, KATH has no policy or framework on HTA guiding decision making in the hospital. In the absence of HTA policy, the interviewee indicated that procurement decisions in the facility are based on criteria in the tender document. The areas of the tender document considered in the procurement decision making process are mandatory requirements, technical specifications, price and payment terms. The interviewee acquired the information on HTA through the principal researcher of the health facility. The interviewee perceived the HTA framework as similar to the Procurement Act. The interviewee believes that it emphasizes on the processes and procedures of arriving at the decision of a brand type to be procured. Notwithstanding the absence of HTA policy, the interviewee believes that the HTA policy is relevant in the achievement of work targets, transparency and accountability, competitiveness in the purchasing system and efficiency in the usage of public funds. The interviewee listed the awarding of contracts to lower tenders without the capability producing the required result and the lack of cooperation by the stakeholders as some of the perceived

weaknesses of the HTA. The interviewee mentioned efficient use of government funds, transparency, value for money, sustainability and environmental friendliness as some of the common features of HTA policy. The interviewee was largely experienced in procurement but limited knowledge in areas like development of evidence-based standard treatment

guidelines, selection of the national essential medicine list, selection of health service to be covered under the NHIS and the design of NHIS benefit packages.

In the absence of the HTA policy, decisions on procurement in the health facility are finalized through meetings by the procurement department that requires the final approval of the CEO of the health facility. The procurement reports of the facility are often assessed and approved by the CEO, the entity tender committee or the central tender committee. The interviewee believes to have ever been involved in HTA-based decision. The HTA activities perceived by the interviewee to be carried out by the health facility are cost-effective analysis and budget impact analysis. These HTA activities were perceived by the interviewee to aid in the achievement of institutional goals, competition in purchases, transparency, accountability and value for money.

The common reasons for manager's refusal to use HTA in decision making is acknowledged by the interviewee to include the tendency to be corrupt, lack of knowledge and the required skills to manage the framework. The interviewee indicated that the desire to use HTA is largely influenced by the desire to reduce cost, offer competition, ensure value for money and the acquisition of quality goods. The interviewee believes that all decisions in the health facility should be based on the HTA policy. The interviewee believes that the Government of Ghana under the auspices of the Ministry of Health should lead HTA implementation and application in the various

health facilities in Ghana. The challenges of the institutionalization and the application of HTA in the health facility as enumerated by the interviewee included lack of cooperation of HODs and stakeholders, and the inadequate knowledge on the framework by suppliers.

The researcher further conducted an interview with a supply chain manager of KATH in charge of civil works, maintenance, services and consultancy. This male interviewee has 15 years of working experience in the health sector and highest educational qualification of master's degree. This interviewee is persistently involved in decision making related to procurement in the health facility. The interviewee indicated that the health facility has no HTA policy or framework guiding decision making. In the absence of HTA policy, the interviewee indicated that procurement decisions are made in the facility on the basis of the specifications of the equipment and modern trends.

The interview indicated to have heard about HTA, and described the policy as the usage of technology in health decision making. The interviewee perceived the policy as a framework for analyzing health decisions and managing health information. The interviewee reported to have been involved HTA-based decisions on several occasions. The interviewee is currently a member of the health e-system implementation committee of the health facility. GIFMIS is the software the health facility intends to adopt to streamline the decision making process. The interviewee perceived HTA as relevant in making more informed, efficient and effective decisions. The likelihood of system breakdown, the complexity and cumbersome nature of the system, resistance to change, implementation difficulty and poor knowledge were some of the perceived potential weakness of the technology by the interviewee. The interviewee indicated to

have experience in the selection of the national essential medicine list, selection of health services to be covered under the NHIS and equipment procurement.

The interviewee indicated that decisions in the facility are taken by the management body of the health facility. Decisions in the facility are often taken by management, head of departments and head of units. The decisions of the facility are made in line with the strategic plans of the health facility, the procurement act and the procurement plans for the year. The HTA-based decisions made by the interviewee were more related to cost-effective and policy analysis. The perceived motivation for the usage of HTA as indicated by the interviewee was improvement in patient care. The interviewee further reported that some managers would opt not to adopt HTA due to the cumbersome nature of the technology, the bureaucracies of the policy, inadequate training and knowledge on the technology. The interviewee perceived the provisions of the law as the key influence on the decision to use HTA. The interviewee indicated that procurement, health financing and clinical decisions should all be guided by HTA. The interviewee believes that all health decisions should be guided HTA, and the implementation and application process of HTA should be spearheaded by the Government of Ghana under the ambit of the Ministry of Health. The key challenges of HTA implementation as perceived by the interviewee were resistance to change, financing difficulties, inadequate knowledge, and the willingness of staff to implement the policy.

The researcher also conducted an interview with a health service administrator in charge of domestics at KATH. The 45 years health service administrator has a highest educational qualification of master's degree and 19 years of working experience in the health sector. The interviewee is often involved in tactical decisions in the health

facility. The interviewee indicated that the health facility has no framework or policy on HTA. The interviewee viewed diagnostic services, health administration system, cancer treatment and surgical procedures as the more appropriate options or priorities for the application of HTA in the health facility. In the absence of HTA, decisions are made in the health facility on the basis of cost-benefit analysis and user requirements.

The interviewee indicated his awareness of HTA and further described it as the assessment of the long and short-term effects of the implementation of technology in healthcare delivery. Nonetheless, the interviewee indicated that he has never been involved in decisions based on HTA. The interviewee has however been involved in related activities like on-going discussions and replacement options financing in the facility. The interviewee deemed HTA relevant as it could facilitate access to affordable technology. Some of the mentioned benefits of HTA by the interviewee were systematic approach to implementation of health technology and facilitation of access to affordable health technology. The interviewee, however, had limited knowledge on some of the weaknesses of HTA adoption. The interviewee has experience in HTA related activities like the development of evidence-based standard treatment guidelines, selection of the national health insurance scheme reimbursement formula, selection of health services to be covered under the NHIS and equipment procurement

The interviewee indicated that decisions in the health facility are made through 5 year strategic plan, annual budget, Act 525, and the MOH policy directives. Decision making in the facility is the responsibility of department and unit heads, directorate heads, KATH management and KATH board. According to the interviewee, the main considerations for decision making in the facility are the various Acts related to healthcare provisions in Ghana, MOH policy directives, and the vision, mission, values

and objectives of KATH. The common HTA related activities carried out in the facility are cost-effective analysis, budget impact analysis and policy analysis.

According to the interviewee, some of the incentives for the usage of HTA are systematic approach to planning, effectiveness of health treatment, efficiency in treatment outcomes. The mentioned disincentives for the usage of HTA were involving, bureaucratic and time-consuming nature of the process. The interviewee indicated that health decisions like diagnostic services, cancer treatment, pharmaceutical products and surgical procedures. The interviewee believes that the implementation of HTA in the health sector in Ghana should be led by the Ministry of Health. The interviewee perceives knowledge and education inadequacies as the key challenges to HTA implementation and application in the health sector.

CHAPTER FIVE

DISCUSSION

This chapter discusses the key findings of the study. The discussions of the result are based on the specific objectives defined. The areas discussed were knowledge level of healthcare managers on HTA, existing policies or framework of HTA in the health system, decision making mechanisms for health delivery, incentives and disincentives for using HTA in healthcare decision making, and the areas of usage of HTA in healthcare.

5.1 Knowledge Level of Healthcare Managers on HTA

The health workers have no training on HTA and hence their level of knowledge on health technology assessment in healthcare is low. Most of the health workers have also never been involved in HTA-based decisions. The health workers largely have no

experience and knowledge in the development of evidence-based standard treatment guidelines, selection of the national essential medicine list, selection of national health insurance scheme reimbursement formula, the selection of health services to be covered under the NHIS and the design of the NHIS benefit packages. Previous studies collaborate this finding as they report low level of knowledge and expertise on HTA in less developed countries like Ghana (Weingart, 1995; Bodeau-Livinec *et al.*, 2006; McGhan *et al.*, 2009; Bray & Weiderpass, 2010). This result is supported by the studies of Abaza and Tawfik (2008) and Mathew (2011) that indicated that the level of HTA application in many developing countries is extremely low or non-existent due to resource constraints. Shortage of technical expertise and health service delivery capacity were also identified in literature to impede HTA adoption.

The experience and knowledge of the health workers was largely in equipment procurement. Nonetheless, the health workers perceived the HTA policy as relevant in decision making in the health sector as it has the potency to ensure effective and efficient decision making in the health sector. The workers also perceived the HTA policy to provide decision makers with information about the possible impacts and consequences of a new technology, information about the significant change in an old technology and involve the reportage on safety, efficacy, feasibility and costeffectiveness of health technologies. The policy lesson from this is that there is the need for awareness creation and training programme to build up knowledge of health workers on HTA to stimulate the desire and the implementation of HTA in healthcare delivery in order to improve the quality of healthcare services.

5.2 Existing Policies or Framework of HTA in the Health System

The health facilities in Ghana have no existing HTA policy. Thus, decision making in the health facilities in Ghana is not guided by any institutionalized health framework or policy on HTA. The hospitals rely on the effectiveness, cost-benefits, efficacy and safety of technologies in making procurement decisions. The reliance on these factors in decision making process in the health facilities is perceived to produce high effect on health outcomes. The decision making are perceived to result in high effect on patient recovery time, patient survival, deliveries, reduction in errors and quick delivery of services to clients. The likelihood of system breakdown, the complexity and cumbersome nature of the system, resistance to change, implementation difficulty and poor knowledge were some of the perceived potential weakness of the HTA policy. In the absence of HTA, KATH is in the discussion process on whether to adopt the Government Integrated Financial Management Information System (GIFMIS) software to streamline the decision making process of the health facility. The absence of HTA in the surveyed hospitals in Ghana was not surprising as the existing literature reported low to non-existence of HTA in developing countries (Abaza & Tawfik, 2008; Mathew, 2011). Nonetheless, the usage of HTA in health facilities in the developed world is commons as reported by several studies (e.g., Menon & Marshall, 1990; Luce & Brown, 1995; Rosenstein *et al.*, 2003; Saaid, 2011). It is therefore evident that Ghana needs a formalized HTA policy to guide healthcare delivery since the Ministry of Health and the Ghana Health Service have no policy framework on HTA guiding healthcare service delivery.

5.3 Decision Making Mechanisms for Health Delivery

The health workers have largely not been involved in decisions based on HTA. At KATH, decision making is largely bottom-up approach oriented. The decision making process is initiated by patients or users of the facility, and hence form the basis as inputs for central management decisions. The decisions in the health facility are made through 5 year strategic plan, annual budget, Act 525, and the MOH policy directives. Decision making in the facility is the responsibility of department and unit heads, directorate heads, KATH management and KATH board. Decision making in the health facility is based on the user's feedback, the ultimate benefits of the decisions, the cost effectiveness of the alternatives, the various Acts related to healthcare provisions in Ghana, MOH policy directives, and the vision, mission, values and objectives of KATH. Also, the decisions of the facility are made in line with the strategic plans of the health facility, the procurement act and the procurement plans for the year. Notwithstanding the absence of HTA policy, the policy is perceived relevant in the achievement of work targets, transparency and accountability, competitiveness in the purchasing system and efficiency in the usage of public funds. This is contrary to hospitals in developed countries that often rely on HTA committees in the acquisition of technologies (Saaid, 2011). Patients awareness and feedback is indicated by the study of Neuner *et al.* (2012) to account a lot in the decision making process of the health facilities. For instance, studies in Wisconsin suggested higher risk of prostate associated with RALP surgeries (Neuner *et al.*, 2012). This consumer awareness therefore stimulated the outcry of the public for more modern technological alternatives (Jin *et al.*, 2011). It is therefore evident that patients need to be involved throughout, and particularly at the early stages (Husereau *et al.*, 2016).

The common HTA related activities carried out in the facility are cost-effective analysis, budget impact analysis and policy analysis. This result is consonance with the previous studies that also emphasized on health facilities reliance on cost-benefit analysis, Cost-effectiveness analysis and budget analysis (Ezzati & Lopez, 2003; Hutubessy *et al.*, 2003). In the absence of the HTA policy, decisions on procurement in the health facility are finalized through periodic meetings by the procurement department that requires the final approval of the CEO of the health facility and materials and equipment specification. The procurement reports of the facility are often assessed and approved by the CEO, the entity tender committee or the central tender committee. The areas of the tender document considered in the procurement decision making process are mandatory requirements, technical specifications, price and payment terms. Notwithstanding the absence of HTA policy in the health facilities in Ghana, HTA is perceived as essential in the achievement of institutional goals, competition in purchases, transparency, accountability and value for money.

The common reasons for manager's refusal to use HTA in decision making include the tendency to be corrupt, lack of knowledge and the required skills to manage the framework. Many managers and healthcare administrators have limited expertise and capacity on HTA in less developed countries and this impedes HTA adoption in the health facilities (Weingart, 1995; Bodeau-Livinec *et al.*, 2006; McGhan *et al.*, 2009; Bray & Weiderpass, 2010).

The health workers believe that all decisions in the health facility should be based on the HTA policy. The health workers believe that the Government of Ghana under the auspices of the Ministry of Health should lead HTA implementation and application in the various health facilities in Ghana. In Ghana, the goal of MOH is to improve the

health status of all people living in Ghana through effective and efficient policy formulation, resource mobilization, monitoring and regulation of delivery of health care by different health agencies (MOH, 2012). The challenges of the institutionalization and the application of HTA in the health facility as enumerated by the health workers included lack of cooperation of HODs and stakeholders, and the inadequate knowledge on the framework by suppliers. It is evident that though HTA is perceived as a necessary tool for quality healthcare service delivery, there is seemingly less effort by the MOH and GHS. The policy lesson is that health administrators are ready to accept HTA implementation and are patiently waiting for a policy implementation to guide the activities of the sector. The readiness of the health administrators needs to be matched by the efforts of the policy makers like MOH and GHS in the implementation of the HTA policy in Ghana.

5.4 Incentives and Disincentives for Using HTA in Healthcare Decision Making

The key incentives for the usage of HTA in the various health facilities in Ghana in decision making in their order of importance were value for money, quality of life, price, emerging pathogens, malpractice avoidance, the availability of alternatives, financial incentives, provider competition, public demand and third party payment. For instance, the health workers of KATH perceived efficient use of government funds, effectiveness of health treatment, cost reduction, competitiveness, transparency, value for money, acquisition of quality products, systematic approach to planning, improvement in patient care, sustainability and environmental friendliness as some of the common incentives for HTA usage. The provision of the law is also perceived as key influence on the decision to use HTA. The adoption of HTA policy also requires the commitment and support of management. The perceived benefits of HTA implementation were systematic approach in decision making and access to affordable

health technology. The perceived incentives for the usage of HTA in decision making are collaborated by previous studies that emphasized costeffectiveness (Bodeau-Livinec *et al.*, 2006; Poulin *et al.*, 2012; Schumacher & Zechmeister, 2013), value for money (Ezzati & Lopez, 2003; Husereau *et al.*, 2016), financial gains (Lee *et al.*, 2003), quality of life, third party payment, provider competition, public demand (Luce and Brown, 1995).

In another instance, the reported disincentives for the usage of HTA policy in decision making in the health facilities in Ghana include inadequate expertise, internal politics ignorance, lack of funds, complex administrative charges, lack official strategic plan, unavailability of information and lack proper structure in that order of magnitude. The other key disincentives or barriers to health facilities adoption of HTA policy in Ghana were bureaucracy, time-consuming nature of the process and the lack of stakeholder cooperation. In some cases, some managers decision avoid the adoption of HTA is largely due to the cumbersome nature of the technology, the bureaucracies of the policy, inadequate training and knowledge on the technology. This result is in consonance with the existing literature that indicates that internal politics (Cram *et al.*, 1997); unfamiliarity with HTA (Saaid, 2011); unavailability of information (BodeauLivinec *et al.*, 2006); shortage of technical expertise and health service capacity to utilize cost-effective analysis information and the existence of management information gap (Hutubessy *et al.*, 2003); lack of funds, complex administrative changes, technology already implanted, technology which would potentially render the hospital vulnerable to legal action (McGregor, 2012) are key disincentives to the implementation and application of HTA in health facilities. From the existing literature, it is evident that incentives and disincentives for HTA are not isolated but consistent with conditions the

world over. The disincentives do not pertain to HTA application alone but a common phenomenon of the absence of policies in many sectors of the Ghanaian economy. It is evident from the study that the MOH and GHS require intensive awareness creation and training programmes and general capacity building for health administrators in order to improve their expertise prior to HTA policy implementation in healthcare delivery in Ghana.

5.5 Areas of Usage of HTA in Healthcare

The areas in the health facilities that HTA related decisions are occasionally used include drugs, biologics, devices equipment supplies and medical surgical procedures. HTA related decisions are also sometimes taken on issues related support system and organizational management. The salient areas in the health facilities in Ghana perceived to require HTA policy are procurement of equipment and logistics, health consultancy, drugs and non-drug consumables, human resource management, health financing, clinical decisions, cancer treatment, pharmaceutical products, diagnostic services, health administration system, cancer treatment and surgical procedures. The identified key challenges to the institutionalization and application of HTA in the mentioned health specific areas were fear of change or resistance to change, financing difficulties, inadequate knowledge, and inadequacy of training on HTA. The health workers believe that HTA implementation and application process is necessary in the health facilities in Ghana should be spearheaded by the Government of Ghana through the Ministry of Health. This result is supported by the study of the US Congress, Office of Technology Assessment (1977) that reported that the key healthcare areas of HTA application include drugs, biologics, devices, equipment and supplies, medical and surgical procedures, support systems and organizational and managerial.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

The chapter presents the necessary conclusions on the basis of the defined objectives of the study. The chapter further makes policy and managerial recommendations feasible for improvement in the implementation and application of HTA in the health sector in Ghana.

6.1 Conclusion

In Ghana, there is no existing policy on HTA guiding decision making in the health facilities. The hospitals rely on the effectiveness, cost-benefits, efficacy and safety of technologies in making decisions. The reliance on these factors in decision making process in the health facilities is perceived to produce high effect on health outcomes. The decision making are perceived to result in high effect on patient recovery time, patient survival, deliveries, reduction in errors and quick delivery of services to clients. The health workers are largely not involved in decisions based on HTA. The decision making process is largely bottom-up approach. The decision making process is initiated by patients or users of the facility, and hence form the basis as inputs for central management decisions. The decisions in the health facility are made through 5 year strategic plan, annual budget, Act 525, and the MOH policy directives. The decisions of the facilities are made in line with the strategic plans of the health facility, the procurement act and the procurement plans for the year.

The absence of HTA policy is partly attributed to the low level of knowledge, training and education on HTA. The health workers have no training on HTA and hence their low level of knowledge on health technology assessment. The health workers deem it

necessary for the health facilities in Ghana to adopt HTA in decision making. The areas in the health facilities that HTA related decisions are occasionally used include drugs, biologics, devices equipment supplies and medical surgical procedures. The salient areas in the health facilities in Ghana perceived to require HTA policy are procurement of equipment and logistics, health consultancy, drugs and non-drug consumables, human resource management, health financing, clinical decisions, cancer treatment, pharmaceutical products, diagnostic services, health administration system, cancer treatment and surgical procedures. The incentives for the usage of HTA in the various health facilities in Ghana in decision making were value for money, quality of life, price, emerging pathogens, malpractice avoidance, the availability of alternatives, financial incentives, provider competition, public demand and third party payment. The provision of the law, efficient use of government funds, effectiveness of health treatment, transparency, systematic approach to planning, improvement in patient care, sustainability and environmental friendliness are also perceived common incentives for HTA usage.

Nonetheless, the perceived disincentives for the usage of HTA policy in decision making in the health facilities in Ghana include inadequate expertise, internal politics ignorance, lack of funds, complex administrative charges, lack official strategic plan, unavailability of information and lack proper structure. The other key disincentives or barriers to health facilities adoption of HTA policy in Ghana were bureaucracy, cumbersome nature of the technology, time-consuming nature of the process and the lack of stakeholder cooperation. Evidently, considering the enormous perceived benefits of HTA to the health facilities in Ghana, the Government of Ghana through the

Ministry of Health is required to initiative implementation and application environment for HTA.

6.2 Recommendations

On the basis of the findings and conclusions, this section of the study presents policy and managerial recommendations feasible for improvement in the implementation and application of HTA in the health sector in Ghana.

6.2.1 There is the need for Policy on HTA in Ghana

The study revealed that healthcare decisions in the various health facilities in Ghana are not guided by HTA policy or framework. This study therefore recommends that policy makers like the Ministry of Health and the Ghana Health Service need to spearhead the introduction of HTA policy in Ghana to guide healthcare delivery. There is the need for provisions in the law to guide the implementation and application of HTA in the health facilities in Ghana. HTA adoption should be offered legal backing to constitute structure and coordinate the activities of the HTA in the health sector.

6.2.2 There is the Need for Capacity Building on HTA

The health workers had low level of knowledge and training on HTA. The low level of knowledge and training meant that the health workers had inadequate expertise to adopt HTA. There is therefore the need to build the capacity of the health administrators in HTA. This can be achieved through formal education and informal education programmes on HTA. Formally, the HTA policy can be introduced in the curriculum of healthcare administration in the higher level of education. Informally, training

programmes can be organized periodically for healthcare administrators to build their capacity on HTA.

6.2.3 Provision of Adequate Funds for HTA Implementation

The study revealed lack of funds and complex administrative charges as key disincentives to the implementation and application of HTA in the health facilities in Ghana. The Government of Ghana through the Ministry of Health should annually allocate adequate funds for the implementation and application of HTA in the health sector. The Ministry of Health and the hospitals can also sought foreign grants for HTA implementation.

6.2.4 Formally Educating Healthcare Administrators on HTA

The health workers reported to have low level of knowledge and training HTA. Low of training and knowledge on HTA were also perceived as disincentive to the implementation and application of HTA in the health facilities in Ghana. This study therefore suggests the inclusion of HTA in the curriculum or course programme of health administrators in the various tertiary institutions in Ghana.

6.3 Suggested Areas for Further Studies

In this study, conclusions and generalisations were made based on data taken on selected health facilities and agencies in the Ashanti region. Thus, future studies should expand the scope to include health facilities and agencies in the other regions of Ghana. The study also focused on public health facilities. Therefore, future studies could investigate the situation in private health facilities in Ghana and compare the findings to the situation in the public health facilities. Other key areas not captured in this study

that require future attention are the an analysis of HTA and reimbursement procedures, developing an approach for using health technology assessments, avoiding and identifying errors in health technology assessment models, developing a decision support system to link health technology assessment (HTA) reports to the health system policies and identifying priority technical and context-specific issues in improving the conduct, reporting and use of health economic evaluation in low- and middle-income countries.



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APPENDICES

Appendix 1: Interview guide for heads of department

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY/SCHOOL OF PUBLIC HEALTH/DEPARTMENT OF HEALTH POLICY, MANAGEMENT & ECONOMICS

INTERVIEW GUIDE FOR HEADS OF DEPARTMENT

HEADS OF

The purpose of the study is to investigate into (Appropriate Incentives for the use of Health Technology Assessment in Health Care Decision Making in Ghana). You will be requested to provide some information through your answers to the questions that will be asked. This interview guide is for academic purposes only and any information gathered will remain confidential. It is in partial fulfillment for the award of Masters of Public Health from the Kwame Nkrumah University of Science and Technology, Kumasi. An interviewee is required to only provide information deemed appropriate to give out on the remits of the facility and personal ethics. All interviewees have the option to decline to respond to any question if they deem too personal, irrelevant or tantamount to revelation of private data. Thank You

Pre interview information

Interviewer's Name.....

Interviewee's ID..... Date of Interview.....

SECTION A: BACKGROUND CHARACTERISTICS

1. Gender Male Female
2. Age of interviewee:
3. Highest level of education:
 Diploma/HND First Degree Master Degree PhD
4. Occupation:.....
5. Working experience in the health sector:
6. What is your position in the health facility?
7. What are your core activities in this organisation?

SECTION B: POLICIES OR FRAMEWORK ON HTA IN THE HEALTH SYSTEM

8. Are you involved in decision making in this facility?
 - a. If yes, what types of decision making are you involved?.....
9. Are there policies or framework on HTA in this facility?
 - a. If there are policies on HTA, what do you know about the policy?.....
 - b. If there are policies on HTA, what do you see as scope for the application of HTA in your organisation?
 - c. What do you see as the priorities for the application of HTA in your outfit?
 - d. If there no HTA policy. On what bases are decisions made?.....
 - e.

SECTION C: KNOWLEDGE OF HEALTHCARE MANAGERS ON HTA

10. Have you heard about HTA?
11. What do you know about HTA?
12. Have you ever been involved in HTA?
13. When was the last time you were engaged in HTA related activity?
14. Do you think HTA is relevant in health care decision making? Explain
15. What are some of the benefits of HTA?
16. What are some of the weaknesses of using HTA?
17. What are some of the key attributes of a HTA
18. Do you have experience in any of the following?
 - a. Development of evidence-based standard treatment guidelines
 - b. Selection of the national essential medicine list
 - c. Selection of the national health insurance scheme reimbursement formulae
 - d. Selection of health services to be covered under the NHIS
 - e. Equipment procurement
 - f. Design of the NHIS benefit package

SECTION D: DECISION MAKING MECHANISM FOR HEALTH DELIVERY

19. How are decisions made in this facility?
20. Who are responsible for decision making in the facility?
21. What are the considerations for the decision making in the facility?
22. Have you ever made an HTA-based decision?
23. Which of these HTA activities are carried out by your outfit?
 - a. Cost-effective analysis
 - b. health economics modeling
 - c. Budget impact analysis
 - d. Policy analysis

SECTION F: INCENTIVES AND DISINCENTIVES FOR USING HTA IN HEALTH CARE DECISION MAKING

23. What are some the motivations for the use of HTA in decision making?
24. Why would a manager not use HTA as a guide in healthy decision making?
25. What would influence you to use HTA in decision making?

SECTION G: AREAS OF USAGE OF HTA IN HEALTHCARE

26. Which health decisions should be guided by HTA?
27. Which health decisions could be made without HTA?
28. Who should lead the implementation of a national HTA in Ghana?
29. What do you see as the key challenges to the institutionalization and application of HTA at your facility?

THANK YOU FOR YOUR TIME

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KNUST.
SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF HEALTH POLICY, MANAGEMENT & ECONOMICS**

APPROPRIATE INCENTIVES FOR THE USE OF HEALTH TECHNOLOGY ASSESSMENT IN HEALTH CARE DECISION MAKING IN GHANA

This is part of a postgraduate research project being conducted by MPH student of KNUST School of Public Health in the Policy Planning Management and Economics, to understand the appropriate incentives for the use of health technology assessment in health care decision making in Ghana.

DECEMBER, 2017

QUESTIONNAIRE FOR HEALTH MANAGERS

Introduction

Good morning/afternoon. I am a student at School of Public Health, KNUST. I will be conducting several meetings with people like you in to find out your views and ideas about “(Appropriate Incentives for the Use of Health Technology Assessment in Health Care Decision Making in Ghana)”. Your opinions are highly essential at the same time vital as they will help us to improve the kind of service we provide. Whatever you say will be treated confidential, so feel at ease to express your candid opinion. Be assured that your responses will not in any way be linked to your identity. You are kindly requested to answer the questions below by indicating a tick or writing the appropriate answer when needed. THANK YOU

Please indicate your answer by ticking the appropriate box []

PART A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

- 24. Gender [] Male [] Female
- 25. Age.....
- 26. Highest level of education:
 Diploma/HND [] First Degree [] Master Degree [] PhD
- 27. The years of working in the health sector,
- 28. Department of work:
- 29. Occupation.....
- 30. Core activities.....

PART B: POLICIES OR FRAMEWORK ON HTA

- 31. Are there policies or framework on HTA in this facility?
 Yes [] No

32. Does Ghana need policy on HTA?

Yes No

33. Explain your answer to question (9).....

PART C: KNOWLEDGE ON HTA

1. Have you had any training on HTA?

Yes No

34. How did you know about HTA?

35. How would you rate your general level of knowledge about HTA?

Don't know Very low low High Very High

36. Please indicate your level of agreement to the under listed statements by choosing from Strongly Agree [5] to Strongly Disagree [1] [Strongly Disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly Agree = 5]

	Statements	1	2	3	4	5
2.	HTA provides decision makers with information about the possible impacts and consequences of a new technology					
3.	HTA provides decision makers with information about the significant change in an old technology					
4.	HTA involves reportage on safety, efficacy, feasibility and cost-effectiveness of health technologies					
5.	HTA application is essential for positive healthcare outcomes					
6.	HTA is important in informing policymaking for technology in health care					

PART D: BASIS FOR DECISION MAKING

37. How are decision made in your outfit?.....

38. Generally, who are involved in decision making?

39. Did the decision making process employed HTA?

40. When was the last time you participated in decision making?

41. What programme was involved in that decision making?

42. What are the bases for decision making in the procurement and use of health technologies

Effectiveness

Cost-benefits

Efficacy

Safety

None of the above

All of the above

Others Please state

PART E: INCENTIVES AND DISINCENTIVES FOR USING HTA

INCENTIVES FOR USING HTA

43. Do you use HTA in making decisions at the hospital?

Yes No

44. Why would you employ HTA in decision making?

DISINCENTIVES FOR USING HTA

45. Why would you not employ HTA in decision making?

.....

46. Is HTA relevant in decision making at all? Why?

.....

47. Please indicate your level of agreement to the under-listed as factors influencing the health facility's decision in using HTA or otherwise by choosing from Strongly Agree [5] to Strongly Disagree [1] [Strongly Disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly Agree = 5]

Factors /Rating	1	2	3	4	5
Incentives					
7. Price					
8. Availability of alternative(s)					
9. Emerging pathogens & other diseases					
10. Third-party payment					
11. Financial incentives					
12. Malpractice avoidance					
13. Provider competition					
14. Public demand					
15. Value for money					
16. Quality of life					
Disincentive					
17. Internal politics, ignorance and unfamiliarity with HTA					
18. Inadequate expertise on HTA					
19. Lack proper structure					
20. Lacked official strategic plan					
21. Unavailability of information					
22. Lack of funds					
23. Complex administrative changes					

PART F: AREAS OF USAGE OF HTA IN HEALTHCARE IN GHANA

If there are elements of usage of HTA at the health facility, then please indicate the areas within the health facility in which HTA is being applied by choosing from „Never Used“ [1] to „Frequently Used“ [4] [Never used = 1, Sometimes Used = 2, Occasionally Used =3, Frequently Used =4]

	Areas of Healthcare	1	2	3	4
24.	Drugs				
25.	Biologics				
26.	Devices, equipment and supplies				
27.	Medical and surgical procedures				
28.	Support systems				
29.	Organizational & managerial				
30.	Others (Please Specify in the spaces provided below)				
	i.				
	ii.				
	iii.				

PART G: EFFECT OF DECISION MAKING ON HEALTHCARE OUTCOMES

31. How would you rate the effect of decision making policies on healthcare delivery of the facility?

Very high

High

Don't Know

Poor

Very Poor

Please indicate the level to which the applied measures in decision making at the health facility influence the under listed health outcomes by choosing from „Low Effect“ [] to „High Effect“ [] [No Effect = 1, Low Effect = 2, High Effect = 3, Very High Effect = 4]

		1	2	3	4
32.	Patient Recovery time				
33.	Patient Survival				
34.	Deliveries				
35.	Reduction in errors				
36.	Quick delivery of services				

Questionnaire number:.....

Appendix 2: Participant Information Leaflet and Consent Form

This leaflet must be given to all prospective participants to enable them know enough about the research before deciding to or not to participate

Title of Research: Appropriate Incentives for the use of Health Technology Assessment (HTA) in Health Care –Decision Making in Ghana.

Name(s) and affiliation(s) of researcher(s):

This study is being conducted by Mr. Elias AnninOsei in the Department of Health Policy Management & Economics of the School of Public Health of Kwame Nkrumah University of Science and Technology.

Background: The study is about Health Technology Assessment, and since there is still limited information on any form of incentives available for stakeholders in the use of HTA in healthcare decisions in Ghana. The financial and professional incentives facing health care providers are perceived to promote clinically and cost effective health interventions, but achieving this in practice is difficult. Therefore, the current study seeks to investigate the appropriate incentives for the use of health technology assessment in health making decisions in Ghana.

Purpose(s) of research:

The purpose of this research is to assess the knowledge level of Healthcare managers on HTA, examine existing policies or framework of HTA in the health system, examine decision making mechanisms for health delivery, assess the incentives and disincentives for using HTA in healthcare decision making; and identify the areas of usage of HTA in healthcare in the KomfoAnokye Teaching Hospital and the Hospitals in the Kumasi Metropolitan Assembly all in Ghana.

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research:

The study employed a two-stage sampling procedure. In the first phase of the sampling procedure, four Kumasi metropolitan hospitals including the Suntreso Hospital, MCH Hospital, Tafo Hospital, Manhyia Hospital and the KATH will be sampled through a purpose sampling procedure. The selected hospitals are willing to allow the researcher collate data on the themes of the study from their premises and allow their staff to partake in the study. In the second stage of the sampling procedure, from the sampling frame collected from the selected hospitals on the Management Members, Health Service Administrators, Pharmacists, Procurement Committee, Mechanical engineers and Bio-medical engineers, a simple random sampling by balloting procedure will be employed to select the staff. A total of 120 participants will be involved.

This method involves the representation of each unit of member of a category by a slip of paper. The slips of papers will be put in a container or a box and shuffled and slip pulled out till the required number of members for each category is met. A purpose sampling procedure will also be employed in the selection of the policy makers and Health managers. Heads of the policy making institutions and persons in the institutions directly involved in health decision making, will be interviewed, especially concerning technology adoption and all forms of procurement will be considered for the study. A total of 7 health managers will be interviewed.

The interview will take about 45 minutes to complete. With your permission the interview will be tape- recorded.

Risk(s):

There may be inconveniences and potential delays in work activities and also some questions may appear embarrassing, or delve into private opinions, among others. The schedule of questionnaires administration and interviews will be done at periods when respondents will be less busy.

Benefit(s):

There will be no direct benefits to participants. However, all participants will be provided with a ball point pen to answer the questionnaire after which they will be asked to retain the pen and GHC. 3.00. Each participant that will be interviewed will be appreciated with GHC. 5.00 Worth of phone credit as compensation for their effort and time.

Confidentiality:

All information collected in this study will be given code numbers. No name will be recorded. Data collected cannot be linked to you in anyway. No name or identifier will be used in any publication or reports from this study. However, as part of our responsibility to conduct this research properly, we may allow officials from the ethics committees to have access to your records.

Voluntariness:

Taking part in this study should be out of your own free will. You are not under obligation to partake in this study. Research is entirely voluntary.

Alternatives to participation:

If you choose not to participate, this will not affect you in any way.

Withdrawal from the research:

You may choose to withdraw from the research at anytime without having to explain yourself. You may also choose not to answer any question you find uncomfortable or private.

Consequence of Withdrawal: There will be no consequence, loss of benefit or care to you if you choose to withdraw from the study. Please note however, that some of the information that may have been obtained from you without identifiers (name etc), before you chose to withdraw, may have been modified or used in analysis reports and publications. These cannot be removed anymore. We do promise to make good faith effort to comply with your wishes as much as practicable.

Costs/Compensation: For your time and inconvenience to the hospital, we will compensate you with GH¢3.00 to show our appreciation for your participation.

Contacts: If you have any question concerning this study, please do not hesitate to contact MR. Elias AnninOsei on 0244841860.

Further, if you have any concern about the conduct of this study, your welfare or your rights as a research participant, you may contact:

**The Office of the Chairman Committee on Human Research and Publication
Ethics Kumasi**
Tel: 03220 63248 or 020 5453785

KNUST



Appendix 3: Consent Form

Statement of person obtaining informed consent:

I have fully explained this research to _____ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: _____

Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction.

I understand that my participation is voluntary (not compulsory).

I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it.

I understand that I may freely stop being part of this study at any time without having to explain myself.

I have received a copy of this information leaflet and consent form to keep for myself.

NAME: _____

DATE: _____ SIGNATURE/THUMB PRINT: _____

Statement of person witnessing consent (Process for Non-Literate Participants):

I _____ (Name of Witness) certify that information given to (Name of Participant), in the local language, is a true reflection of what I have read from the study Participant Information Leaflet, attached.

WITNESS'S SIGNATURE (maintain if participant is non-literate): _____

MOTHER'S SIGNATURE (maintain if participant is under 18 years): _____

MOTHER'S NAME: _____

FATHER'S SIGNATURE (maintain if participant is under 18 years): _____

FATHER'S NAME: _____

KNUST



Appendix

4: Approval letter



KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES



SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Ref: CHRPE/AP/035/18

5th February, 2018.

Mr. Elias Annin Osei
Post Office Box KS 5256
ADUM-KUMASI.

Dear Sir,

LETTER OF APPROVAL

Protocol Title: "Appropriate Incentives for the Use of Health Technology Assessment in Health Care – Decision Making in Ghana."

Proposed Sites: Komfo Anokye Teaching Hospital, Kumasi; Kumasi Metropolitan Hospitals: MCH Hospital; Tafo Hospital; Manhyia Hospital; Suntreso Hospital; WHO and Ministry of Health, Accra.

Sponsor: Principal Investigator.

Your submission to the Committee on Human Research, Publications and Ethics on the above named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 11th May, 2016 from the Kumasi Metro Health Directorate (study site) indicating approval for the conduct of the study in the Metropolis.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire and Interview Guide.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 5th February, 2018 to 4th February, 2019 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,

Rev. Prof. John Appiah-Poku
Honorary Secretary
FOR: CHAIRMAN

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh

Appendix

5: Letter of introduction

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

My Ref. No: KMHD/ROT/13
Your Ref. No:

Tel. No. 0201168535 / 0549023582

Fax. No.

E-mail: abnyarko@gmail.com



METRO HEALTH DIRECTORATE
GHANA HEALTH SERVICE
P. O. BOX KS 12588
KUMASI

11TH MAY, 2016

- THE MEDICAL SUPERINTENDENTS
 - > MCH HOSPITAL
 - > TAFO HOSPITAL
 - > MANHYIA HOSPITAL
 - > SUNTRESO HOSPITAL
- KUMASI

LETTER OF INTRODUCTION

This is to introduce to you **Mr. Elias Annin Osei** an MPH Planning and Management Student from the School of Public Health, Kwame Nkrumah University of Science and Technology, Kumasi.

He is conducting a research on the Topic; **Appropriate Incentives For The Use Of Health Technology Assessment In Health Making Decisions In Ghana.**

Management of the Metro Health Directorate will be grateful if you could give him the necessary assistance.

Thank you.

JENNIFER GYEBI
SENIOR HUMAN RESOURCE MANAGER
for: METRO DIRECTOR OF HEALTH SERVICES
KUMASI

Appendix

6: Certificate of Registration



KOMFO ANOKYE TEACHING HOSPITAL
RESEARCH AND DEVELOPMENT UNIT (R & D)
CERTIFICATE OF REGISTRATION

REG. NO. RD/CR17/225

This is to certify that

Prof/Dr/Mrs/Mr/Ms. Elias Annin Osei
has registered his/her proposed study titled Appropriate Incentives for the Use of Health Technology Assessment in Health Care-Decision Making in Ghana at the Komfo Anokye Teaching Hospital
.....with the Research and Development Unit.

Date 21st July, 2017

Name of issuing officer

Juliet Ampomah Frimpong

Signature

K/16/0299895

***This certificate does not constitute ethical clearance for the conduct of the study but proof of registration of study with KATH. Ethical clearance from the Committee of Human Research Publications and Ethics (CHRPE) is required to conduct the study*