SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
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COMMITMENT AMONG SENIOR MANAGERS TO THE USE OF DISTRICT
HEALTH INFORMATION MANAGEMENT SYSTEM 2 DATA FOR DECISION
MAKING IN MATERNAL AND NEONATAL HEALTH IN GREATER ACCRA
REGION

BY
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AWARD OF MASTER OF PUBLIC HEALTH DEGREE

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DECLARATION

I, Fred Darko Effah, declare that except for other people’s works, which have been duly acknowledged using referencing, this work is the result of my original research, and that this dissertation, either in whole or part has not been presented elsewhere

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ABSTRACT

**Background:** Many countries consistently have data that is of poor quality and or data that arrives too late to back important indicators of human lives. Studies show that the standard procedure for data use to keep track and measure the health system in Sub-Saharan Africa has mostly been strictly communication reliant on, with problems due to poor response coils.

**Objective:** To determine factors that contribute to the commitment level among senior managers toward the use of district health information management system 2 (DHIMS2) data for decision making relating to maternal and neonatal health in the Tema Metropolitan Assembly area of the Greater Accra Region.

**Methods:** This study adopted a quantitative research approach and was conducted in public health facilities in the Tema Metropolitan Assembly locale. A structured questionnaire was administered to sixty-six senior managers of health care services to collect data for the study. They responded to questions covering variables such as behavioural factors, organisational factors, and challenges associated with commitment to using district health information management system 2 (DHIMS2) data for decision making relating to maternal and neonatal health. Socio-demographic characteristics were also analysed. Analysis of research data was done using the descriptive and inferential approach using STATA 14 and Microsoft Excel version 2016. The research hypotheses were tested using linear multiple regression analysis and correlation analysis.

**Results:** The study revealed that the Tema Metropolitan Assembly area of the Greater Accra Region was mostly dominated by senior managers who happened to be males (67%) in the
health sector. The average age distribution of senior managers within the region was 47 (38%) years with the highest age range of 51-60 (47%) recorded. The study found a significant value of $p<0.021$, which was less than a 0.05 level of significance. This implies that, there was no significant relationship between socio-demographic characteristics and senior managers’ commitment to data utilization for decisions on maternal and neonatal health. In addition, the study recorded a Pearson Chi-Square value of 4.001 with a respective significant value of 0.06, which was greater than a significance level of 0.05. Therefore, there was a sufficient evidence to support the claim that senior managers’ commitment was influenced by the behavioural factors on DHIMS2 data usage. The study found a Pearson Chi-Square value of 3.273 with a respective significant value of 0.070. Therefore, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the organisational factors in data usage. The study showed a significant value of .014 ($p = .014$), which was below 0.01. Consequently, there was a relationship in the mean of the challenges associated with senior managers’ commitment to usage of DHIMS2 data for decision making on maternal and neonatal health.

**Conclusions/Recommendation:** Based on the above findings the study concludes and recommends that there is the need for: intensification of community health education and mobilization on maternal and neonatal health by using the district health information management system 2 (DHIMS2) data to identify zones or areas within the community that are prone to maternal and neonatal morbidity and mortality; and senior managers’ empowerment to make decisions on maternal and neonatal health using the (DHIMS2) data is of paramount interest. With the adaptation of the district health information management system 2 (DHIMS2) data, senior managers must take keen interest in establishing or developing appropriate criteria for selecting interventions for addressing maternal and
neonatal constraints. Resources should be provided to senior managers to help facilitate data gathering processes to find the root causes of constraints associated with maternal and neonatal health.
DEDICATION

This work is dedicated to my mother, Victoria Anane Antwiwaa, my sister, Diana Naana Asia
and my brother, Maxwell Gyarko Effah.
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TABLE OF CONTENTS

DECLARATION ........................................................................................................................................ i
ABSTRACT ............................................................................................................................................. ii
DEDICATION .......................................................................................................................................... v
ACKNOWLEDGEMENT ...................................................................................................................... vi
Table of Contents ............................................................................................................................... vii
LIST OF FIGURES ................................................................................................................................ xi
LIST OF TABLES .................................................................................................................................... xii
LIST OF ABBREVIATIONS .................................................................................................................. xiii
CHAPTER ONE ...................................................................................................................................... 1
INTRODUCTION ................................................................................................................................. 1
  1. Background to the study ............................................................................................................... 1
  1.1. Problem Statement .................................................................................................................. 5
  1.2. Justification of the study ......................................................................................................... 8
  1.3. Objectives of the Study .......................................................................................................... 10
    1.3.1. General Objective .......................................................................................................... 10
    1.3.2. Specific Objectives ........................................................................................................ 10
    1.3.3. Research Questions ....................................................................................................... 11
  1.4. Outline of the Dissertation .................................................................................................... 12
CHAPTER TWO .................................................................................................................................... 13
LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK ......................................................... 13
  2.0 Introduction ............................................................................................................................... 13
  2.1. Challenges with Health Information Management System for Maternal and Neonatal Health .................................................................................................................. 13
  2.2. Health information and health service planning and decision-making ............................ 15
  2.3. Management Commitment ................................................................................................... 17
  2.4. Organizational Structure of Ghana Health Service ............................................................. 17
  2.5. The Performance of Routine Information Systems Management Framework ............... 23
  2.6. Routine Health Information Systems (RHIS) ..................................................................... 24
    2.6.1. Routine Health Information System Processes ........................................................... 24
    2.6.2. Improved RHIS and Health System Performance ......................................................... 26
    2.6.3. Implementation and Utilization of Health Management Information System ........ 27
    2.6.4. Challenges Associated with DHIMS2 Data ................................................................. 30
5.5. Influence of Challenges on Senior Managers’ Commitment to the Use of DHIMS2 Data

5.6. Summary of the chapter

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

6.2. Summary of the study

6.3. Conclusions of the study

6.4. Contribution to knowledge

6.4.1. Contribution to policy and practice

6.4.2. Implication for Management of Health Care Institutions

6.5. Recommendations

6.6. Limitations to the study

6.7. Future Research

REFERENCES

APPENDIXES

Appendix A: Study Questionnaire
LIST OF FIGURES

Figure 1: Modified Conceptual Framework ................................................................. 25

Figure 2: Behavioural factors influencing commitment to the use of DHIMS2 data for decision making in maternal and neonatal health. Source: Field Data, 2017 ......................... 57

Figure 4.1: Behavioural factors influencing commitment to the use of DHIMS2 data for decision making in maternal and neonatal health. Source: Field Data, 2017 ......................... 59
LIST OF TABLES

Table 4.1: Demographic Characteristics of respondents ...................................................... 53
Table 4.2: Respondents Experience with DHIMS2 Data ...................................................... 55
Table 4.3: Estimated Regression Coefficient: Relationship between behavioural factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health .............. 62
Table 4.4: Chi-Square Test: Relationship between behavioural factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health ........................................... 63
Table 4.5: ANOVA: Analysis of Variance of the influence of Behavioural Factors of Senior Managers’ Commitment on DHIMS2 Data Utilization ......................................................... 65
Table 4.6: Chi-Square Test: Challenges to Senior Managers’ Commitment to the Use of DHIMS2 Data ......................................................................................................................... 66
Table 4.7: Estimated Regression Coefficient: Relationship between Organizational Factors and Senior Managers’ Commitment Level to DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health ........................................................................ 68
Table 4.8: Analysis of Variance of the Relationship between Organizational Factors and Senior Managers’ Commitment to DHIMS2 Data Utilization .................................................. 70
Table 4.9: Chi-Square Test: Organizational Factors and Senior Managers’ Commitment to the Utilization of DHIMS2 Data ........................................................................................................... 71
Table 4.10: Estimated Regression Coefficient: Challenges Associated with Senior Managers’ Commitment to the use of DHIMS2 Data ........................................................................................................... 73
Table 4.11: Analysis of Variance on Challenges Associated with Senior Managers’ Commitment to the use of DHIMS2 Data Usage ........................................................................................................... 75
LIST OF ABBREVIATIONS

AMA Accra Metropolitan Assembly
BMC Budget Management Centre
CHPS Community Health Planning and Service
DDHS District Director of Health Services
DDNS Deputy Director Nursing Services
DHMIS2 District Health Management Information System 2
DHMT District Health Management Team
ERC Ethical Review Committee
GHS Ghana Health Service
HIO Health Information Officer
IBM International Business Machine
IT Information Technology
LQAS Lot Quality Assurance Sampling
MDGs Millennium Development Goals
MMDHD Metropolitan, Municipal and District Health Directorate
MMDDHS Metropolitan, Municipal and District Director of Health Service
MMR Maternal Mortally Rate
MOH Ministry of Health
PHN Public Health Nurse
PMTCT Prevention of Mother to Child Transmission of HIV
PRISM Performance of Routine Information Systems Management
RHIS Routine Health Information Systems
SDGs Sustainable Development Goals
CHAPTER ONE

INTRODUCTION

10 Background to the study

Every year, approximately 10 million children die before their fifth birthday (UNICEF, 2006). The main causes are acute respiratory infection, diarrhoea, malaria, measles, malnutrition and prenatal disorders (Lindstrand et al., 2006). According to the World Health Organization (WHO, 2013) the common causative diseases that contribute to under-five mortality in Ghana include those endemic to sub-Saharan African countries, particularly, cholera, typhoid, pulmonary Tuberculosis, anthrax, pertussis, tetanus, chicken pox, yellow fever, measles, infectious Trachoma, malaria and schistosomiasis (WHO, 2012). By contrast, Sub-Saharan Africa had the highest average under-five mortality rate, amounting to 174 per 1000 live births in 2002 (Lindstrand et al., 2006).

There are many factors determining child health these include mobility and usage of statistical data, parental education, availability and accessibility to health service and distribution of income families. A study on developing countries by Caldwell and McDonald (1982), also showed the significant effect of increasing data utilization on reducing child mortality. The research ranks the significance of maternal unavailability and utilization of statistical data on maternal and neonatal health even higher than the effects of income, maternal education and access to health facilities combined.

There has been significant progress in the world in recent years in pursuing particular areas of social advances, including access to water and sanitation, child and maternal health, nutrition and poverty (Data Revolution Group, 2014). Nonetheless, many countries consistently have data that is of poor quality and or data that arrives too late to back these important indicators
of human lives (Data Revolution Group, 2014).

Studies show that the standard procedure for data use to keep track and measure the health system in Sub-Saharan Africa has mostly been strictly communication reliant on, with problems due to poor response coils (Mutale, Chintu, Amoroso, Awoonor-Williams, Phillips, Baynes, Michel, Taylor, & Sherr, 2013). Mutale et al. (2013), note that implementation to date has emphasized on the significance of involving forefront workers and executives in advancing data collation and using the data to inform the improvement of systems.

The post-Millennium Development Goals report showed that Eastern Asia and Southern Asia had the highest advancement in the decline of maternal mortality towards the Millennium Development Goals (MDGs), but the same was not so from Sub-Saharan Africa and Southern Asia (United Nations, 2015). Together, the two regions accounted for 86% of such mortalities globally in 2013 (Thompson & Evans-Klock, 2015). At the same time, Sub-Saharan Africa had the highest among the 1 million deaths occurring in the first day of life, which represented 36% of all neonatal deaths in 2013 (United Nations, 2015).

Evidence shows that most developing countries made progress in reducing maternal mortality in the MDGs, but the target for 95 per 100,000 live births was still farfetched for these developing countries including Ghana (Iwuamadi, 2014). The post-MDGs Report (2015), highlighted the need for sustainable development, to be underpinned by the demand for a data revolution. This approach is to advance the availability, quality, timeliness, and disaggregation of data to back the implementation of the new development agenda [(Sustainable Development Goals (SDGs)] at all levels (United Nations, 2015).

In Ghana, District Health Information Management System 2 (DHIMS2) was specifically tailored to suit the country’s needs for Health Information Management (Awoonor-Williams
et al., 2013). Awoonor-Williams et al. (2013), indicate that the emergence of this has helped in solving the majority of the health care system’s problems, including simplifying, elimination of bulky registers and forms and the decentralization of the health care system and improving the flow of information and supports the integration of health service operations.

At the facility level, health service works/workers relate with users of the health centre, including patients and other clients and constantly make decisions about needs and the suitable interventions to provide (Oduro-Mensah et al., 2013). Oduro-Mensah et al. (2013), argue that possibly, vital backings for this procedure are accessibility and use of evidence based or informed decision-making strategies and procedures that enhance and make work more reliable, by decreasing presumptions and encouraging compliance with values.

Managers’ commitment to their organisations and the use of information for decision making is a topical issue that needs some attention in the delivery of quality healthcare, especially in the area of maternal and child healthcare (Stevens, Beyer, & Trice, 1978). Stevens et al. (1978), used a role and exchange theory framework to examine the commitment of 634 managers in 71 federal government organizations to their organization and to the federal service in the United States. These researchers reported that certain role factors such as tenure and work overload and personal factors such as attitude toward change and job involvement were strong influences on commitment. From the field of education, Mumtaz (2000), suggests that teachers' beliefs about teaching and learning with information, communication and technology (ICT) are central to integration; and that successful implementation of ICT needs to address three interlocking frameworks for change: the teacher, the school and policy makers.
The idea is that quality of healthcare, especially maternal and child health will improve when health managers are committed to the use of health information for decision making. This is as a result of the fact that quality in healthcare is a production of cooperation between the patient and the healthcare provider in a supportive environment (Mohammad Mosadeghrad, 2014). Mosadeghrad (2014), explained that personal factors of the provider and the patient, and factors pertaining to the healthcare organisation, healthcare system, and the broader environment affect healthcare service quality. Therefore, healthcare quality can be improved by supportive visionary leadership, proper planning, education and training, availability of resources, effective management of resources, employees and processes, and collaboration and cooperation among providers.

To be able to understand how managers of health institutions utilize District Health Information Management System 2 (DHIMS2) for decision-making towards improving quality of maternal and neonatal health, it was imperative to assess their commitment. The Cambridge Dictionary (2017), defines commitment as a “willingness to give your time and energy to something that you believe in, or a promise or firm decision to do something”. Hence, in forecasting the state of being committed to someone or something and for understanding the underlying causes of commitment, the investment model makes a claim that, satisfaction, lack of alternatives and investments are influencers to a person’s commitment to someone or something (Rusbult, Martz, & Agnew, 1998).

This study was undertaken to understand how senior managers’ commitment to using the DHIMS2 data could influence their decisions in providing quality maternal and neonatal/child health.
1.1. Problem Statement

High quality routine health system data is highly relevant for monitoring advancement towards achievement of the Millennium Development Goals four and five which is twin to the Sustainable Development Goal three. Completeness, availability, consistency, reliability, precision or accuracy and commitment to use such routine health system data is a major constraint in Ghana (Kayode et al., 2014). Kayode et al. (2014), explain that DHIMS2 is the database for storing health service data in Ghana.

Prudent data practice adherence is essential for the attainment of high quality data (Awoonor-Williams et al., 2013). According to Awoonor-Williams et al. (2013), the burden of neonatal deaths, evident in routine data is unacceptably high, remained undetected for years because of late submissions and incompleteness of reports. These researchers show the view that the primary aim of health information data management is to ensure high-quality data to support monitoring, evaluation, research and decision making and to ensure that information gathered at the health facility is being utilized at the health facility for predictions, forecasting, monitoring, evaluation and policy formulations of their services before it is being submitted to the District Health Administration for usage, compilation, storage, and dissemination (Awoonor-Williams et al., 2013).

However, a study reported that of all the statistical reports submitted to the District Health Administration, it was clear that not all government health facilities report on regular basis, though they provide health care services to pregnant women both before and after childbirth; to a good fraction of people in the Tema Metropolitan Assembly (TMA) (Kayode et al., 2014). This act distorts the consistency within data space. In practice, health management information system HMIS is not being adequately utilized at community, facility, or district level (Wickremasinghe, Hashmi, Schellenberg, & Avan, 2016).
The case and condition is similar to the Ghanaian health sector. There might be a number of reasons for this. One is the absence of standardized process for their use (Harrison, & Nutley, 2010; Qazi, & Ali, 2011). Secondly, data may be incomplete or, not available or of a poor quality (Nutley, Gnassou, Traore, Bosso, & Mullen, 2014). Thirdly, data is used for different purposes such as task force surveillance rather than for decision-making (Feldman & March, 1981). Wickremasinghe et al. (2016), state this (third reason) when they considered information use in an organization, and argued that this may apply to the field of health administration.

It could be argued that in most cases, senior managers' commitment to the use of DHIMS is influenced by the socio-demographic factors, behavioural factors, organisational factors, technical factors and challenges within the healthcare environment (Mohammad Mosadeghrad, 2014). (Shaikh et al., 2003), also argue that it is important to see the factors determining the health behaviours in various contexts: physical, socio-economic, cultural and political.

Socio-demographic characteristics of senior managers have been seen to be causing problems for their commitment to the use of information for decision making (Shaikh et al., 2003). Shaikh et al. (2003), confirm that the utilization of a health care system, public or private, formal or non-formal, may depend on socio-demographic factors, social structures, level of education, cultural beliefs and practices, gender discrimination, status of women, economic and political systems environmental conditions, and the disease pattern and health care system itself.

Indeed, behavioural and issues of perception influencing the use of information for decision
making has been reported (Thompson-Leduc, Clayman, Turcotte, & Légaré, 2015). For example, studies reported that perception of the benefits of the innovation (system usefulness) was the most common facilitating factor, followed by ease of use; and issues regarding design, technical concerns, familiarity with ICT, and time were the most frequent limiting factors to the use of information for decision making in healthcare organisations (Thompson-Leduc et al., 2015). It would be argued that policy makers may lack the understanding of the drivers of health seeking behaviour of the population in an increasingly pluralistic health care system (Shaikh, & Hatcher, 2004).

Technical challenges could also frustrate the use of information for decision making among even patients, not excluding senior managers. A study demonstrated that perceived usefulness, perceived ease of use, subjective norm, and healthcare knowledge together predicted most of the variance in patients' acceptance and self-reported use of the web-based self-management technology. This means that senior managers should be able to use technology to take decisions and also encourage patients to access needed information that is free from issues of credibility.

A study confirmed the importance of the credibility of information on the frequency of Internet use as a preferred source of information on personal health. This is necessary because the internet has potential influence on the development of personal knowledge of health issues (Lemire, Paré, Sicotte, & Harvey, 2008). Even in the field of education, studies reveal a number of factors which influence teachers' decisions to use ICT in the classroom: access to resources, quality of software and hardware, ease of use, incentives to change, support and collegiality in their school, school and national polices, commitment to professional learning and background in formal computer training (Mumtaz, 2000).
Crucially, organisational factors also do have some influence on the commitment to the use of information for decision making among senior managers. Using data from 394 respondents, a study investigated the relationships between a multidimensional, theoretically grounded configuration of high-involvement human resources practices and turnover intentions (Paré & Tremblay, 2007). Paré and Tremblay (2007), found that nonmonetary recognition and competency development, and, to a lesser extent, fair rewards and information-sharing practices, were negatively and directly related to turnover intentions. These researchers also observed that procedural justice, affective and continuance commitment, and citizenship behaviours partially mediated the effects of high-involvement human resources practices on the turnover intentions of highly skilled professionals.

In health systems, managerial or administrative decisions are not always based on the data (Papaioannou et al., 2003; Wa, Walshe, & Rundall, 2001). In Ghana, the case is no different. There is limited use of data in decision making; in addition to having challenges that are affecting and limiting data use. It is expected that, the findings of this study will influence the commitment level of senior managers to use DHIMS2 data for decision making relative to maternal and neonatal health in the Tema Metropolitan Assembly area. This was done by analysing existing, other available and significant data sources in the metropolis that could possibly be integrated into the metropolitan health data for thorough planning, decision and policy making.

1.2. Justification of the study

Studies suggest that a more concerted effort is required for designing behavioural health promotion campaigns through inter-sectoral collaboration focusing more on disadvantaged segments of the population (Shaikh, & Hatcher, 2004). As the world shift to a society which
is more dependent on data, the significance of readily available health data is crucial to the health and well-being of a country’s population. In this environment, questions raised are: is there available minimal health information for the population and what role does the Tema Metropolitan Health Administration (TMHA) and DHIMS play in ensuring the availability of information with the limited available resources (Ibrahim, 2016).

This study sought to ascertain whether managers understood the utility of DHIMS2 tasks, felt confident and competent in performing their tasks, and perceived that the task's complexity was challenging but not overwhelming, and how they would complete the tasks diligently. The DHIMS2 implies solving problems using information. However, problem-solving skill development was not a large part of Routine Health Information System (RHIS) capacity building in the past (Jargowsky & Yang, 2005).

The work brings attention to this neglected area. The DHIMS2 framework postulates that organizational and technical determinants also affect behavioural determinants. This research considers organizational determinants crucial for affecting performance and defines this category as all those factors that are related to organizational structure, resources, procedures, support services, and culture to develop, manage and improve DHIMS 2 processes and performance. It provides a good knowledge and information technology skills to effectively use and sustain it. However, in low technology settings, well-designed, paper-based DHIMS 2 can still achieve acceptable levels of performance in accordance with maternal and neonatal health.

The study examined the use of the District Health Information Management System 2 by senior managers to facilitate decision making, and policy formulation at the metropolitan level. This work would also serve as a relevant document for researchers who will want to
investigate more into the subject. Globally, there have not been many studies conducted on the commitment to the use of health data unlike commitment to other social issues, including relationships, products and services (Kandlhofer & Steinbauer, 2014). This study sought to contribute to making a step in advancing knowledge that would help address the gap between data generation and data usage for decision-making.

The findings of the study therefore, should be of use to the Ministry of Health, Ghana Health Service, Ghana Statistical Service, Regional Health Management Teams and other stakeholders such as NGOs in designing and implementing maternal and neonatal health intervention programmes and projects.

1.3. Objectives of the Study

The objectives of the study have been arranged under general and specific as below.

1.3.1. General Objective

The general objective of the study was to determine factors that contribute to the commitment level among senior managers toward the use of DHIMS2 data for decision making relating to maternal and neonatal health in the Tema Metropolitan Assembly area of the Greater Accra Region.

1.3.2. Specific Objectives

The specific objectives of the study were:

1. To examine socio-demographic factors that contribute to senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.
2. To assess behavioural factors influencing senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

3. To investigate technical factors influencing senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

4. To examine organizational factors influencing senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

5. To ascertain challenges confronting senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

1.3.3. Research Questions

To be able to realize the research aims, the ensuing questions were addressed:

1. How do socio-demographic factors contribute to senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health?

2. How do behavioural factors influence senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health?

3. Which technical factors influence senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health?
4. How do organizational factors influence senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health?

5. What challenges confront senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health?

1.4. Outline of the Dissertation

This dissertation is divided into six main chapters. Chapter one presents background to the study. Chapter two reviews empirical literature in relation to the main themes of the topic. Chapter three presents the methods that were used in the study while chapter four presents the results of the study. Chapter five and six are discussion of the results and summary, conclusions and recommendations respectively.
CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 Introduction

This chapter presents the review of related literature on the concepts underlying the study. There are nine main sections and subsections.

2.1. Challenges with Health Information Management System for Maternal and Neonatal Health

The World Health Organization (World Health Organization, 2008), defines a maternal death as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, its management but not from accidental or incidental cause. The burden of neonatal deaths, evident in routine data as unacceptably high, remained undetected for years because of late submissions and incompleteness of reports (Boadu, 2014). It was through the Ghana Demographic Health Survey that this national crisis evident (Ghana Statistical Service & Ghana Demographic Health Survey, 2008). Subsequent analysis of routine data showed the same trend of high neonatal mortality. With this reality, many developing countries struggle with the implementation of health management information system (HMIS) (Kuhn & Giuse, 2001).

From 1990 to 2013, maternal mortality declined from 760 to 380 maternal deaths per 100,000 live births (United Nations, 2015). The United Nations report that though this was an accomplishment, which halved Maternal Mortality Ratio (MMR), the Millennium Development Goal Target of 190 deaths per 100,000 live births was still not achieved by most developing countries, including Ghana (United Nations, 2015).
From the time when the 2000 Millennium Declaration was made, enormous progress has been made in reducing child mortality worldwide with under-five deaths decreasing faster than at any other time during the past two decades (United Nations, 2015). Notwithstanding these gains, only 23 of the 75 ‘Countdown to 2015’ priority countries were predicted to reach their Millennium Development Goal (MDG) 4 targets (Vogel, Tepper, & Restubog, 2015).

It is anticipated that much improvements could be achieved in the reduction of maternal and neonatal mortalities if managers were able to utilize information for decision making, and ensure effective relationship between decision making and utilization of information. In the Ghana Health Service (GHS), data gathering begins with the registries and tally sheets at the facilities (Poppe, 2012). The collected and collated data is uploaded directly to the DHIMS2 database with immediate access to the district, regional and national level for utilization at all levels (Kayode et al., 2014).

The relationship between better-quality information, demand for data, and continued data use creates a cycle that leads to improved health programmes and policies (Nutley & Reynolds, 2013). The size of records in the world is increasing exponentially, and one estimate has it that about 90% of the data in the world has been generated in the last two years (IBM, 2016). Notwithstanding, its obvious importance for use in periodic decisions, RHIS has repeatedly been described to be perforated with many difficulties including, incompleteness, poor quality, and a propensity to over-report or under-report (Sharma, Rana, Prinja, & Kumar, 2016).
2.2. Health information and health service planning and decision-making

The tasks of an institution are directed at the realization of goals, which are influenced by proper planning, managerial creativity and resource availability (Boadu, 2014). Boadu (2014), argues that, consistent with this aim, the setting is pertinent at all hierarchies and health staff in charge of routine health information is no exception. This researcher explains that most significantly, since resources are limited to achieve these aims, decisions should be made about which substitute should be pursued and using quality health information. That is, decision-making explains the health, productivity and ultimate survival of an institution (Boadu, 2014). It comprises making a choice between alternative courses of action, for instance, to employ or outsource. The use of information, which is of poor quality in decision-making leads to poor goal setting, appraisal of an alternative course of actions and poor planning (Kamadjeu, Tapang, & Moluh, 2005; Rotich et al., 2003).

In most entities, including the health sector, decisions are made at three levels; strategic, operational and administrative (Brinkerhoff, 2003). At the strategic level is where long-term decisions, which involve the organisation’s relationship with its milieu, especially decisions touching on the organisation’s products or services and markets are considered (Boadu, 2014). In a situation like this, it implies the association between the Ministry of Health/Ghana Health Service (MOH/GHS) and the rest of the divisions and firms within and outside the health sector.

Operational level decisions are short termed and are made in answer to operational matters such as the volume of production, pricing and inventory levels (Boadu, 2014). In the case of the health sector, it may involve the kind of service, payment mechanisms, stores and supplies of pharmaceutics and diagnostics and for its clients. The administrative decision-
making arises from and is subject to the conflicting demands of strategic and operating
problems. For instance, in dealing with the conflicting health for all in the midst of acute
shortage of health staff and facilities, an administrative decision will be the creation of
Community Health Planning and Service (CHPS) compounds or use of mobile clinics or
outreach services.

Planning begins where decision making ends, that is, when a decision has been made about
which alternatives are needed to achieve the desired outcomes or objectives (McKay, 2001).
For instance, if the Ghana Health Service (GHS) decides to outsource rather than train some
of its critical staff, then management plans on the modalities for outsourcing. By extension,
health service planning involves forecasting, anticipating and preparing for the present to face
conditions that may arise in the future. It is concerned with deciding in relevance to what to
do, who is to do it, how to do it, where, when and where to do it (McKay, 2001).

Planning is anticipating the future and how to bring it to fruition (McKay, 2001).
Consequently, health service planning and management may be described as the likely health
effects and efficient and well-organized ways of realising them (Boadu, 2014). Quality data
and information on daily activities are needed for analysis, interpretation, and utilisation of
information on the past, present and future health outcomes. Disease burden in the form of
mortality, morbidity, cost and psychosocial burden, for health decision making, all bolster the
significance of Routine Health Information System (RHIS) (Guenther et al., 2014).

Sources of information for decision making in health include research, health systems and
more importantly RHIS (Aqil, Lippeveld, & Hozumi, 2009). However, the strengths of RHIS
is in its ability to provide local and culturally contextual relevant data, which provide the
actual picture of what pertains in a health setting or country (Aql et al., 2009). Thus, its role in health service planning and management decision making cannot be overemphasised.

2.3. Management Commitment

The title of senior manager is often found in large organizations with multiple layers of management (Reh, 2018). Reh (2018), explains that a senior manager has responsibilities and authority broader in scope than a frontline manager and typically reports to a director or general manager. Other studies also indicate that senior managers at all levels are expected to demonstrate their commitment to the health establishment through, implementation, assessment and continual improvement of the management system and allocation of adequate resources to carry out these activities (Boadu, 2014).

Senior management develop individual values, institutional values and behavioural expectations for the health sector to support the implementation of the Health Information Management Systems and usually act as role models in the visible promulgation of these values and expectations (Reh, 2018). Senior managers at all levels also foster the involvement of all individuals in the implementation and continual improvement of the health systems. Finally, one of the roles in decision making of senior managers is to ensure that it is clear, when, how and by whom decisions are to be made within the management system (Reh, 2018). The organisational structure of the Ghana Health Service provides the management decision making levels as explained below.

2.4. Organizational Structure of Ghana Health Service

As a result of decentralization and health sector reform, services are integrated as one goes down the hierarchy of health structure from the national to the sub-district.
Administrative Level Structures

At the national level, the Ghana Health Service is managed by the Ghana Health Service Council, the Director-General and eight national divisional directors.

Office of the Director General and Deputy Director General

The management of health services delivery of the country is headed by the Director General (DG) and a Deputy Director General (DDG). Their respective functions are presented below.

Director General (DG)

The Director General is appointed by the President in accordance with the advice of the Council given in consultation with the Public Services Commission. A Director-General of the Service is the Chief Executive of the Service. The Director-General should be a person in the health profession with considerable knowledge of and experience in planning, organization and management of the delivery of health services with the following functions:

The Director-General shall hold office on such terms and conditions as shall be specified in his letter of appointment. Subject to such general directives as the Council may give, the Director-General shall be responsible for the direction of the work of the Service and for the day-to-day administration of the Service and shall ensure the implementation of the decisions of the Council,

Without prejudice to subsection (4) of this section, the Director-General shall provide to the Minister such technical advice as the Minister may require,
The Director-General shall co-ordinate work programmes and provide administrative rules, guidelines and procedures to facilitate the achievement of targets set by the Ministry and establish systems for effective collaboration and co-operation to avoid duplication and to achieve harmonization of programmes within the Service,

The Director-General may delegate such of his duties as he may determine to any officer of the Service but the Director-General shall not be relieved from ultimate responsibility for the discharge of any delegated function.

*Deputy Director General (DDG)*

The office of the Deputy Director General, is birth through the appointment of the President in accordance with the advice of the Council given in consultation with the Public Services Commission. A Deputy Director-General is tasked with the following functions:

- The Deputy Director-General shall hold office on such terms and conditions as shall be specified in his/her letter of appointment,

- The Deputy Director-General shall be responsible to the Director-General in the performance of his/her functions under this Act,

- The Deputy Director-General shall, subject to the provisions of this Act, assist the Director-General in the discharge of his/her functions and perform such other functions as the Director-General may delegate to him; and be responsible for the direction of the Service when the Director-General is absent from Ghana or is otherwise unable to perform his/her functions.
National divisional directors

There are eight directorates designed to support the Director-General and the Deputy Director-General in the discharge of health care services in the country. According to Act 525 (1996):

The Council may with the approval of the Minister create such units or divisions within the Service at the national level as it may consider necessary for the efficient discharge of the functions of the Service and may with the approval of the minister abolish or re-organize any unit or division.

Without prejudice to subsection (1) of this section, the Council shall establish the following divisions:

(a) Public Health Division;

(b) Institutional Care Division;

(c) Policy, Planning, Monitoring and Evaluation Division;

(c) (d) Health Administration and Support Services Division;

(e) Supplies, Stores and Drug Management Division;

(f) Human Resource Development Division;

(g) Finance division; and
(h) such other divisions as the Council may determine.

3. The Council shall determine the functions of the Divisions.

Regional level

At the regional level, curative services are delivered at the regional hospitals and public health services by the District Health Management Team (DHMT) as well as the Public Health division of the regional hospital. The Regional Health Administration or Directorate (RHA) provides supervision and management support to the districts and sub-districts within each region. Regions are headed by 10 regional directors of health services supported by Regional health management teams and Regional health committees.

District level

At the district level, curative services are provided by district hospitals many of which are mission or faith based. Public health services are provided by the DHMT and the Public Health unit of the district hospitals. The District Health Administration (DHA) provides supervision and management support to the sub-districts. All 170 districts are headed by district directors of health services, supported by the district health management teams, district health committees and sub-district health management teams.

Sub-district level

At the sub-district level both preventive and curative services are provided by the health centres as well as out-reach services to the communities within their catchment areas. Basic preventive and curative services for minor ailments are being addressed at the community and household level with the introduction of the Community-based Health Planning and
Services (CHPS). The role played by the traditional birth attendants (TBAs) and the traditional healers is also receiving national recognition.

*District hospitals*

District hospitals are the facilities for clinical care at the district level. District hospitals serve an average population of 100,000–200,000 people in a clearly defined geographical area. The number of beds in a district hospital is usually between 50 and 60. It is the first referral hospital and forms an integral part of the district health system. A District Hospital should provide the following:

1. Curative care, preventive care, and promotion of health of the people in the district
2. Quality clinical care by a more skilled and competent staff than those of the health centres and polyclinics
3. Treatment techniques, such as surgery not available at health centres
4. Laboratory and other diagnostic techniques appropriate to the medical, surgical, and outpatient activities of the district hospital
5. Outpatient and in-patient care

The above administrative levels are organized as budget and management centres or cost centres for purposes of administering Government of Ghana and developmental partner funds. There are a total of 223 functional Budget Management Centres (BMCs) and 110 sub-district BMCs, 10 regional health administration, 8 regional hospitals, 110 district health administrations, and 95 district hospitals (GHS, 2015).

Policy implementation, management and co-ordinating of the District Health Information Management System 2 is under the supervision of the regional directorates (GHS, 2015).
Health Information Management System usually, compiled or gathered at the district level with the district director or senior manager is being burdened with the sole responsibility of reporting on statistical analysis and interpretations in relation to the respective districts. In many countries, the responsibility for planning and delivery of health services data is decentralized to the sub-national level (Kiberu et al., 2014).

2.5. The Performance of Routine Information Systems Management Framework

The study was conceptualized around the Performance of Routine Information Systems Management (PRISM) framework (Aqil et al., 2009). The framework is a major change in approach in Routine Health Information Systems (RHIS) scheme and assessment by seeing RHIS as a system with a defined performance. Aqil et al. (2009), explain that the framework proposes the continuous development of RHIS performance by examining the part of each of these causes and recognising suitable remedies to tackle factors that negatively impact on RHIS performance. Through a wider examination of organisational information necessities, it also hampers disintegration of the prevailing RHIS and encourages a more joined method to information system advancement (Aqil et al., 2009).

The PRISM framework conditions that RHIS performance is influenced by RHIS procedures, which in turn are influenced by technical, behavioural and organizational determinants (Aqil et al., 2009). Aqil et al. (2009), outline that, the framework shows that behavioural determinants have a direct effect on RHIS processes and performance. Technical and organizational causes can affect RHIS procedures and output unswervingly or incidentally through behaviour factors. For instance, the complexity of data collection forms (technical) could have an impact on performance directly or indirectly by lowering motivation (Aqil et al., 2009). Thus, some researchers argue that, the PRISM framework delineates the direct and indirect relationships of the determinants of RHIS performance and measures their relative
importance (D. R. Hotchkiss, Aqil, Lippeveld, & Mukooyo, 2010). Aqil et al. (2009), suggest that, the PRISM framework also opens opportunities for assessing the relationships between RHIS performance, health system performance, and health status.

2.6. Routine Health Information Systems (RHIS)

Health information system strengthening has received exceptional attention in recent years (D. Hotchkiss, Diana, & Foreit, 2012). This is shown by the creation of the Health Metrics Network, the assembling of the Global Health Information Forum in 2010 in Bangkok, and the launch of President Obama’s Global Health Initiative (Khalifa, 2013). Accordingly, varied tools, including Lot Quality Assurance Sampling (LQAS), Routine Data Quality Assessment Tool, Health Metrics Network (HMN) Framework and PRISM have been used to analyse the relationship between RHIS, health system performance and health outcomes (Aqil et al., 2009).

These frameworks only present the relationship between RHIS and performance. Unlike the other frameworks, which only present the relationships between RHIS and performance, the PRISM framework goes outside the association that exists between RHIS processes and performance and augments a new layer of specific and contextual elements (Aqil et al., 2009). Aqil et al. (2009), present that these factors are netted under three groups: behavioural, organizational and technical. To keep the PRISM framework rigorous, the study included those determinants that were empirically verified and amenable to change specifically in the Ghanaian Ministry of Health and the Ghana Health Service, which could be used to bolster planning, and decision making in maternal and neonatal health.

2.6.1. Routine Health Information System Processes

In order to meet data needs for immediate disaster response, data collection platforms and
data processes must be strengthened. This may mean reaching beyond the normal health-sector data sources in order to provide the type of data and data linkages required, for example, data on water resources and water-related diseases, the nutritional status of children under-5 and food supply and security (Aung & Whittaker, 2013). The PRISM framework (Figure 2.1) identifies technical, organizational and behavioural factors which affect RHIS processes (Aqil et al. 2009). These processes are data collection, transmission, processing, analysis, presentation, quality checking and feedback, and should be standardized pre-disaster by establishing procedures and protocols which are feasible to operate in disaster settings.

Figure 1

The following is an overview of the factors influencing RHIS processes. Adequate numbers of competent staff, sufficient supplies and suitable infrastructure are required to design and
maintain an effective information system. Providing legislative and funding structures for those requirements demands commitment and support from government and high-level health authorities (Mcdonnell et al., 2007).

RHIS should be designed to aid health workers and decision makers throughout the data processes and not to burden health workers with data collection and reporting. Hence, in designing RHIS, technical and organizational factors to be considered include involving users in the system design and testing (McDonnell et al. 2007), avoiding complex reporting forms and procedures, implementing user-friendly information technology, setting up appropriate channels for timely information flow, establishing linkages between data producers and data users, and providing appropriate training. It is expected, as a result, that health workers will become motivated, confident and competent in HIS tasks (Aqil et al. 2009).

2.6.2. Improved RHIS and Health System Performance

PRISM tools provide the methods to objectively measure data quality and the degree to which information is used for evidence-based decision making. For example, all health facilities in a district were submitting monthly RHIS reports to the district health office, but only 50% of the data in the reports were accurate when compared with patient records. Information was not used for decision making; the district office did not systematically review RHIS information (Teklegiorgis, Tadesse, Mirutse, & Terefe, 2016)

PRISM tools identify specific technical, behavioural, and organizational factors that affect RHIS performance. In the case above, RHIS performance was hindered by complicated data collection registers and forms, lack of motivation of staff to collect data, and their lack of understanding of the utility of that data. Senior managers were not interested in using the information that was collected. A key advantage of PRISM tools is the focus on behavioural
and organizational determinants, and how these issues relate to technical determinants. The PRISM approach clarifies whether technical, behavioural, and organizational determinants have influenced performance directly or are mediated through behavioural factors.

The most sophisticated computer network available could still produce fallible data if management has not established a culture that fosters staff knowledge, best practices, and motivation. The PRISM assessment, therefore, provides a holistic picture of the existing information system - an informed, real-world perspective from which to design the most effective improvements (Teklegiorgis et al., 2016).

2.6.3. Implementation and Utilization of Health Management Information System

Use of information in organizations such as the Ghana Health Service rest upon the judicial authority of the people and the importance that is given to other considerations despite the availability of information (Grindle & Thomas, 1991). However, without assessing the use of information, it is difficult to know whether an RHIS is meeting its envisioned objectives, improving evidence-based decision-making and consequently leading to better health system performance. Therefore, in this study, efforts were made to operationalise the use of information for measurement (MEASURE Evaluation, 2005). The PRISM framework defines the use of information employing criteria such as the ability to identify problems, consider or make decisions among alternatives, and for advocacy (Aqil et al., 2009). Based on this definition, an RHIS performance diagnostic tool was developed for measuring RHIS performance (Aqil et al., 2009).

By defining and assessing RHIS outcomes, the PRISM framework draws attention to setting and achieving targets, which act as motivators to self-regulate and continuously improve performance (McLaughlin & Kaluzny, 1994). The framework recognizes the site of
responsibility for actions leading to improved accountability. Nevertheless, performance is considered as a system's characteristic (Berwick, 1996). Thus, it needs to be seen in conjunction with system processes and the determinants affecting them.

Participants in a study were requested to show how data was utilised in all 16 organizations (Foreit K, Moreland S, 2006). Foreit and Moreland (2006), observed that respondents indicated that, they mainly used information gathered to ask for new funding and update current donors on programme activities. Nonetheless, the participants again reported that due to the requirements attached to their sources of financing, the data collected did not always align with the information needed to make internal programme and service delivery decisions.

In the Democratic Republic of Congo, participants who worked on a Malaria Programme indicated that they mainly used data for decisions on performance management such as where and how often to conduct monitoring and supervisory visits, training and technical assistance (Isabel Brodsky, 2017). Brodsky (2017), reports that these decisions were made at the national, provincial, and health zone levels of the health system. The respondents also asserted that data were analysed and used in decision making across five groups of decision types: performance management, disease surveillance, supply-chain management, priority setting, and advocacy (Brodsky, 2017).

Studies conducted in Kenya and Nigeria on policy makers’ perception of data use constraints found that, key informants from a population agency used data drawn from 1998 and 2003 Kenya Demographic and Health Surveys (KDHS), 1999 Census, preliminary results of the 2004 Kenya Service Provision Assessment (KSPA), and programme reports to make decisions regarding repositioning of family planning and reproductive health programmes in
the country (Measure Evaluation, 2005). However, the informants lacked information on some community-based family planning workers who facilitated the programmes. The information that was lacking would not be found from the main partners, the Ministry and other stakeholders. The health information system of the Ministry of Health did not collect such information and the data collected on family planning service providers were incomplete and hence, only give a broad view of the health situation (Measure Evaluation, 2005).

A qualitative assessment of the impact of a decision-support tool for decision making at the district level in Kenya showed that using the District Health Profile Tool to generate reports showed trends and drew conclusions about programme progress that facilitated easy decision making (Nutley, McNabb, & Salentine, 2013). Nutley et al. (2013), revealed that a DHRIO indicated that the instrument supports the need to review quarterly accomplishments during the DHMT meeting because meeting members are now able to measure the up-take of services in the district. It was clarified that the tool made it stress-free to guarantee that the goals are achieved based on what was written down at the start of the quarter; and also noted how the procedure works to improve future target setting. The success of the HMIS partly hinge on data dissemination and feedback relations as well as on skilled and driven staff at every level that correctly transmits out their data gathering, dissemination and use duties (D. R. Hotchkiss et al., 2010).

Nutley and Reynolds (2013b), note that certain activities can be carried out to improve data demand and use. These include the ability to assess and improve the data use context, involve data users and data generators, enhance data quality, enhance data accessibility, identify information needs, build capacity in data use core competencies, monitor, evaluate, and disseminate results of data used for interventions, strengthen the organization’s data demand and use of infrastructure.
It is suggested that to create a culture of data demand and use to strengthen family planning programmes in Ethiopia, it is important to improve data availability access, strengthen the organization’s data use of infrastructure, improve data quality, identify information needs, identify and engage data users and data producers and build capacity in data use of core competencies (Pact Worldwide; MEASURE Evaluation, 2014).

2.6.4. Challenges Associated with DHIMS2 Data

A study revealed that, the data-use score at the district level in Cote d’Ivoire increased from 44% in 2008 to 70% in 2012, but the data-use score at the facility level remained the same at 38% (Nutley et al., 2014). Nutley et al. (2014), note that useful data for health managers at all levels for planning, budgeting and decision-making has not been timely or complete. Some of the reasons that accounted for the stagnation of data use were attributed to, recognizing and committing resources to sustain the system contributed to low stakeholder buy-in (Nutley et al., 2014).

Difficulty in tracking both reporting, non-reporting facilities and greater challenge for monitoring and evaluating activities of the sector are some major challenges of DHIMS (Mutale, Chintu, Amoroso, Awoonor-Williams, Phillips, Baynes, Michel, Taylor, Sherr, et al., 2013). In reviewing the constraints to using data for decision making, it was conceptualized that, the decision-making process revolved around information availability, information use, demand for data and data collection analysis (Measure-Evaluation, 2010). The cycle leads to improved accountability and improved health decisions. In Uganda, for instance, it was found that, the processes of checking data accuracy and providing feedback on the submitted monthly reports were not implemented, making it difficult for staff to understand the importance of collected data not only for improving their performance but
also for the department or higher level or as a whole (Hotchkisset et al., 2010).

Hotchkisset et al. (2010) report that obtaining routine service data (useful data) from all health facilities across the country had been the single most immediate challenge of the health sector. In Uganda, data gathering and reporting forms were considered as not sufficiently dispersed to health facilities and district health offices. Furthermore, there was recognition that reporting forms were not correctly entered and submitted, nor were data correctly analysed, feedback and used by the District Health Offices and facilities for forecasting and managers’ decision-making (Hotchkiss et al., 2010). This culminates in the slow response of GHS to addressing potential health emergencies and epidemics and planning relative to maternal and neonatal health (Hotchkisset et al., 2010). Studies observed that RHIS are frequently ignored for assessing fundamental effects of health interventions due to worries about wholeness, it being on time, representativeness and correctness (Wagenaar, Sherr, Fernandes, & Wagenaar, 2016).

2.7. Conceptual Framework for the study

Based on the afore-discussed framework, the study adopted part of the Performance of Routine Information Systems Management (PRISM) model (Hotchkiss et al., 2010), for its conceptual framework. The PRISM framework is a major change in approach in Routine Health Information Systems (RHIS) scheme and assessment by seeing RHIS as a structure with a clear performance. The PRISM framework describes the processes that influence the performance of organizational, technical and behavioural determinants.

The PRISM framework suggests unremitting enhancement of RHIS performance by evaluating the part of each of these factors and recognizing suitable programmes to tackle
causes that harmfully affect RHIS performance. Through a wider examination of organisational information requirements, it also hampers disintegration of the present RHIS and encourages a more cohesive approach to information system development (Hotchkiss et al., 2010).

The framework positions that RHIS performance is influenced by RHIS procedures, which in line are influenced by technical, behavioural and organisational elements, leading to the attainment of improved maternal and new-born health outcomes (see Figure 2.2). Behavioural factors are shown to have a straight impact on RHIS procedures and execution. Technical and organisational factors have the ability to influence RHIS processes and performance explicitly or implicitly over behavioural factors. As an example, the intricacy of data gathering forms (technical) could impact performance unswervingly or incidentally by dropping enthusiasm. In this regard, the PRISM framework outlines the explicit and implicit associations of the factors of RHIS performance and ascertain the comparative significance of these factors. The PRISM framework creates an avenue for measuring the relationship between RHIS performance, system, performance and health outcomes.

The core components of the information system (refer to Figure 2.1) were described as the development of indicators based on management information needs, data collection, transmission, and processing and analysis, which all lead to information use. The researcher assumed that if senior management provided the resources (finances, training material, reporting forms, computer equipment, etc.) and developed organizational rules (RHIS policies, data collection procedures, etc.) then the information system would be used and sustained. During that same period, international donors such as UNICEF and USAID
heavily influenced health information system development (Aqil et al., 2009).

Figure 2: Modified Conceptual Framework.

While the draft PRISM framework provided a new direction in analysing RHIS performance, further work was needed to delineate the boundaries of the technical, behavioural and organizational determinants, and to specify the relationship between the three categories to measure their relative impact on RHIS performance. There was also a need to clarify the role of RHIS processes (refer to Figure 2.2) on RHIS performance in an attempt to assess the commitment levels of senior managers towards the use of DHIMS2 data for decision making in respect of maternal and new-born health.
This called for the need to adapt some of the variables in the PRISM framework; behavioural, organisational, and technical factors, in addition to socio-demographic characteristics for analysis. It was also imperative to consider the challenges confronting the commitment levels of these senior managers to the use of DHIMS2 Data towards achieving the set objectives in maternal and new-born health outcomes. The variables of interest in this study have been explained below.

2.7.1. Behavioural determinants (factors) of RHIS

RHIS users demand confidence, motivation, and competence to perform RHIS tasks that affect RHIS processes and performance directly. How a person, for example, a health worker who works directly with data generation, exploration and interpretation, feels about the usefulness or outcomes of a task, or his confidence in performing that task affects how the task will be conducted (Teklegiorgis et al., 2016). The complexity of the task also affects the likelihood of that task to be performed (Hackman & Oldham, 1980). Incomplete information of RHIS data is known to be the main reason for low data quality and information used in health facilities (Aqil et al., 2009).

Motivating RHIS users remains a challenge despite training on data collection and data analysis - a negative attitude such as ‘data collection is a useless activity or waste of health care providers’ time’ and hinder the performance of RHIS tasks (Aqil et al., 2009). The PRISM framework assumes that if health staff and other users of RHIS comprehend the usefulness of RHIS responsibilities, feel poised and capable in executing the duty, and recognize that the duty's difficulty is stimulating but not overpowering; then they will finish the task diligently (Aqil et al., 2009).
2.7.2. Organizational determinants (factors) of RHIS

RHIS handlers work in an organizational setting, which impacts on them through organizational guidelines, standards, and practices (Aqil et al., 2009). This organizational setting is the health services system and can be achieved by the public or the private sector. Institutional elements such as inadequacies in human and financial resources, low management support, lack of supervision and leadership, which are not new to health facilities in Ghana, impacting on RHIS performance are explained in the information system literature (Nsubuga et al., 2002). The PRISM framework takes notice of the organizational determinants crucial in impacting on performance and describes this group as all those reasons that are connected to organizational structure, resources, processes, auxiliary services, and beliefs to improve, manage and enhance RHIS processes and performance (D. R. Hotchkiss et al., 2010).

The regulation of organizational procedures works well when aggregate values are used than using formal structures (Lemken, Kahler, Rittenbruch, & Bonn, 2000). Alternatively, people act on disseminating what is valuable and esteemed in an organization but do not at all times act on what they are told to do. Shared values related to information systems are alluded to as a pre-existing culture of data collection (Aqil et al., 2009), or culture of information (Hotchkiss et al., 2006), without specifying how these values originate and sustain themselves. In the health system, data collectors’ perception is just a replica of the aforementioned submission. Most of the data collectors see their duties as routine without appreciating the essence and relevance of data for decision making.

2.7.3. Technical determinants (factors) of RHIS

For this study, technical determinants are explained as all the elements that are linked to the specific expertise and technology to create, maintain and enhance RHIS procedures and
performance in the Ghana Health Service (Aqil et al., 2009). These aspects denote the coming up of indicators; designing data collection tools and standard operating procedures (Teklegiorgis et al., 2016). Others also describe these factors as possibly impacting on RHIS performance (Nsubuga et al., 2002). Information technology will continue to be the driving force for information system development as computers function and connect faster. Thus, it is necessary that RHIS practitioners have sound knowledge and information technology skills to effectively use and sustain it.

Data collection tools become difficult to fill if indicators are unfitting and if computer software is not comprehensible, it will impact on the confidence level and enthusiasm of RHIS users (Aqil et al., 2009). In moments where a software does not process data appropriately and promptly, subsequent analyses will not deliver significant deductions for decision-making. It will affect the use of information. Therefore, technical determinants might affect performance directly or through behavioural factors (Aqil et al., 2009).

2.8. Gaps in the literature

There has been considerable advancement in data generation and the availability of data in the world with about 90% of the data being produced in the last two years alone (IBM, 2016). However, there is increasing gap between the acquisition of data and their meaningful use (Economist Intelligence Unit, 2013). Considering how health managers spend most of their working time generating data, it is important for the data to be used. This study sought to contribute to connecting the gap between the use of data to decision making by studying data use in maternal and neonatal health for decision-making.
2.9. Chapter Summary

This chapter presented the reviewed literature about health information and health service planning and decision making. It further delved into the GHS management structure and managerial roles as prescribed by Act 525 (Republic of Ghana, 1996). The theoretical foundations for the PRISM framework, which the study was conceptualized around was also discussed. The chapter also discussed manager’s commitment and the various factors that influence them as outlined in other literature. The next chapter discusses in detail the methods that were used in collecting empirical data for analysis in the study.
CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter presents the methods that were applied to collect empirical data for analysis in the study. There are eleven main sections and subsections.

3.2. Study Design

The study employed a cross-sectional design using quantitative research method. A cross-sectional design is a type of research design in which the researcher studies, whether the whole population or a subsection and from this population, data are gathered to help answer research questions of interest at a point in time (Olsen, Marie, & George, 2004). The study used this form since the study examined data on events that had already occurred (Creswell, 2013). Creswell (2013), explains that it involves relatively large numbers of respondents which are designed to generate information that can be projected to the whole population.

Quantitative method procedures are the extent to which the study results can be projected to a wider population of interest (Creswell, 2013). This can be justified by numbers. It seeks structured responses that can be summarized in numbers, like percentages, average or other statistics (Creswell, 2013). Fixed responses are also more convenient for computer analysis which is how most surveys are analysed.

The descriptive research method was used to systematically investigate factors associated with senior managers' commitment to the use of DHIMS2 data for decision-making in maternal and neonatal health in the Tema Metropolitan Assembly (TMA) area of the Greater Accra Region. The main purpose of using descriptive research method was to obtain first-
hand data from respondents. In gathering information, there was a heavy reliance on the use of primary data, which were collected through the use of questionnaires.

### 3.3. Study Location/Area

The study was conducted in the Tema Metropolitan Assembly of the Greater Accra Region. TMA is one of sixteen metropolitan, municipal and district Assemblies in the Greater Accra Region, which is also one of the ten administrative regions in Ghana. The Greater Accra Region is situated in the south-central part of Ghana and is boarded with the Central Region to the West, Volta Region to the east, Eastern Region to the north, and the Gulf of Guinea to the south. Having an area of 3,245 square kilometres or 1.4% of the total land area of Ghana, the Greater Accra Region is the smallest of the ten regions (Bentsi-Enchill, Cudjoe, Sepah, Anarfi, & Gaisie, 2013).

Two main forms of occupation describe the districts in the region. Sales workers and general workers are the two major occupations in Accra Metropolitan Assembly (AMA), Tema and Ga Municipality. In Shai Osudoku District, about half of the economically vibrant population is engaged in agriculture, animal husbandry, fishing, and hunting (Bentsi-Enchill et al., 2013). The Region has seventy-six hospitals with the majority of HIMS facilities concentrated in AMA, Tema, and Ga Municipality with each of the districts in the region having a health directorate (DHIMS2, 2016).

### 3.4. Study Population

The study included all senior managers of health care services who handle and manage data within the Tema Metropolis where there are five public health facilities as well as a Metropolitan Health Directorate and numerous private hospitals. These include: metropolitan director of health service, municipal director of health service, medical director or superintendent, deputy director of nursing services or matron (Hospital), deputy director
nursing service (regional or metropolitan directorate), district health management team member, Principal nursing officer (PNO), health nursing officer (HIO), health information officer, and other representatives.

That is to say that, the study population included Metropolitan, Municipal and District Health Directors of Health Services, who per their position make the day-to-day decisions for the Health Directorate under their jurisdiction. The District Health Management Team (DHMT) also supports the health directors in making decisions on health issues concerning the Directorate they work with. Deputy Director of Nursing Service (DDNS) and Public Health Nurses (PHNs). In some facilities, Health Information Officers and Principal Nursing Officers occupy positions as senior managers, and this category of the staff was included. These categories of the staff are responsible for the day-to-day running of the health directorates or departments, which fall under the directorates and are major decision makers at their level of operation.

3.4.1. Inclusion criteria

The criteria for participating in the study included the fact that the individual had to be a Metropolitan, Municipal or District Director of Health Service (MMDDHS), Medical Superintendent/Director, DDNS, DHMT Member, PNO, HIO or any other person who served as a senior manager.

3.4.2. Exclusion criteria

The criteria for excluding participants in the study included the fact that the individual should not be a Metropolitan, Municipal or District Director of Health Service (MMDDHS), Medical Superintendent/Director, DDNS, DHMT Member, PNO, HIO or any other person who did not serve as a senior manager.
3.5. Sampling Approach

The study used purposive sampling to select the metropolitan, municipal or districts with the highest number of hospitals. The purposive sampling technique, also called judgment sampling, is the careful selection of a respondent due to the qualities the respondent possesses (Tongco, 2007). It is a nonprobability method that does not need underlying theories or a set number of informants. Tongco (2007), indicates that the investigator decides what needs to be known and sets out to find participants who can and are willing to provide the information by their knowledge or experience. The participants in the study (Senior Managers) had the knowledge and expertise needed to answer the research questions, which necessitated the use of the purposive sampling method in selecting them. By default, each district had a health directorate, which was selected in addition to at least, two hospitals in the selected districts.

3.5.1. Sample Size Determination

The issues are similar if we are designing a survey or an experiment to estimate a population mean. In this case, the formula used was:

\[ ME = \frac{t \cdot s}{\sqrt{n}} \]

Where,

- **ME** - is the desired margin of error
- **t** - is the t-score that we use to calculate the confidence interval, that depends on both the degrees of freedom and the desired confidence level,
- **s** - is the standard deviation,
- **n** - is the sample size we want to find.

In calculating the estimated sample size, the following assumptions were taken into
consideration:

**Assumption 1:** Each of the 16 districts would have either a Metro, Municipal or District Health Directorate with a District Health Director of Health Service, at least, three DHMT members, one PHN present in the Directorate.

**Assumption 2:** Each of the sixteen districts would have three hospitals with a medical director or superintendent, administrator, Deputy Director Nursing Services (DDNS) or matron and a Public Health Nurse (PHN) present at the facility.

Based on assumption 2, one of the districts with the highest number of hospitals was selected, which was a total of seven districts each having one MMDHD. Based on the assumption 2 and the seven districts obtained, sixty-six hospitals were obtained for the hospital population, which gave a total of one hundred and sixty-eight (168) participants. From the entire population of 203, StatCalc software version 7.2.0.1 was used to calculate the sample size using, a 5% acceptable margin of error with 95% confidence interval to get a total sample size of 66.

### 3.6. Study Variables

The study variables are divided into both dependent and independent as explained below.

#### 3.6.1. Dependent variable

The dependent variable was commitment to the use of DHIMS2 Data for decision-making. This was measured in relation to maternal and neonatal health outcomes.

#### 3.6.2. Independent variables

The independent variables were as explained below.

*Socio-demographic characteristics* (managers’ factors): Age, sex, ethnicity, religion, rank, duration of employment, among others.
**Organizational factors:** Seek feedback from concerned persons, emphasize data quality in monthly reports, discuss conflicts openly to resolve them, seek feedback from concerned community, use HMIS data for setting targets and monitoring, check data quality at the facility and higher level regularly, provide regular feedback to their staff through regular report based on evidence, report on data accuracy regularly.

**Behavioural factors:** Personal liking, superiors’ directives, evidence/facts, political interference, comparing data with strategic health objectives, health needs, considering costs.

**Challenges to the use of DHIMS2 Data:** Seeking feedback from concerned persons, emphasize data quality in monthly reports, discuss conflicts openly to resolve them, seek feedback from concerned community, use DHIMS2 data for setting targets and monitoring, check data quality at the facility and higher level regularly, provide regular feedback to their staff through regular report based on evidence, report on data accuracy regularly.

### 3.6.3. Hypotheses of the study

The study sought to find statistical answers to the following hypotheses:

H₁: Socio-economic factors have an association with senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

H₂: Behavioural factors have a relationship with senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

H₃: Organizational factors have a relationship with senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

H₄: Challenges have an association with senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.
3.7. Data Collection– Questionnaire Design and Administration

The data for this research was collected from May to June 2017. A quantitative data collection approach was used to collect data on factors influencing commitment level among senior managers to the use of DHIMS2 data for decision-making relative to maternal and neonatal health. A structured questionnaire was designed with close-ended questions, which allowed participants to select from a scale. The questionnaire was divided into sections.

Section A asked questions concerning socio-demographic variables/characteristics (managers’ factors). These included variables such as the title/rank of the person filling the questionnaire (whether he or she is a Metropolitan Director of Health Service, Municipal Director of Health Service, Medical Director or Superintendent, among others), their age, sex and years of experience in the service.

Section B asked questions concerning organizational factors: Seek feedback from concerned persons, Emphasize data quality in monthly reports, Discuss conflicts openly to resolve them, Seek feedback from concerned community, Use HMIS data for setting targets and monitoring, Check data quality at the facility and higher level regularly, Provide regular feedback to their staff through regular report based on evidence, Report on data accuracy regularly.

Section C asked questions concerning technical factors: Personal liking, superiors’ directives, evidence/facts, political interference, comparing data with strategic, health objectives, health needs, considering costs.

Section D asked questions concerning behavioural factors: Seeking feedback from concerned persons, Emphasize data quality in monthly reports, discuss conflicts openly to resolve them, seek feedback from concerned community, use DHIMS2 data for setting targets and...
monitoring, check data quality at the facility and higher level regularly, provide regular
feedback to their staff through regular report based on evidence, report on data accuracy
regularly.

Section E sought answers to address the challenges to the use of DHIMS2 Data: Seeking
feedback from concerned persons, emphasize data quality in monthly reports, discuss
conflicts openly to resolve them, seek feedback from concerned community, use DHIMS2
data for setting targets and monitoring, check data quality at the facility and higher level
regularly, provide regular feedback to their staff through regular report based on evidence,
report on data accuracy regularly. The questionnaire for this study was adapted from the
questionnaire that was used in building the PRISM framework.

A five point Likert scale survey questionnaire was employed, which measured the particular
variables on a scale of one to five where; 1 = strongly agree, 2 = agree, 3 = uncertain, 4 =
disagree, 5 = strongly disagree. The questionnaires were self-administered and were given to
the study participants for three working days to be completed after which they were retrieved
from them by research assistants. Considering the busy schedules of the study participants, an
extra two working days were allocated to cater for any unforeseen events that might have
prevented them from completing the questionnaire within three days (see Appendix B for the
questionnaire).

3.8. Data Processing and Analysis

Quantitative techniques were used in analysing data. Quantitative data were analysed by the
researcher using STATA 14 software. EPI INFO® version 7.2.0.1 was used to capture the
data, which was programmed to ignore values, which fell outside the scale range. This served
as a check to ensure quality and credible data. This is to say that, analysis of research data
was done using the descriptive and inferential approach using STATA 14 and Microsoft Excel version 2016. Hence, findings were presented in the form of percentages, graphs, tables, and charts.

Finally, the research hypotheses were tested using linear multiple regression analysis and correlation analysis. The $p$-values show the relationship between senior managers and each predictor. If the values are positive, there is a positive relation between the predictor and the outcome whereas a negative coefficient represents a negative relationship. For these data, predictor variables have positive $p$-values indicating positive relationships. The $p$-value also indicates what degree each predictor affects the outcome if the effects of all other predictors are held constant.

Each of the beta values has an associated standard error indicating to what extent these values would vary across different samples, and these standard errors are used to determine whether or not the $p$-value differs significantly from zero (using the t-statistic). Therefore, if the t-test associated with a $p$-value is significant (if the value in the column labelled Sig. is less than 0.05), then that predictor is making a significant contribution to the model. The smaller the value of Sig. (and the larger the value of t) the greater the contribution of the predictor.

### 3.8.1. Multiple Linear Regression Model

Multiple linear regression attempts to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. Every value of the independent variable $x$ is associated with a value of the dependent variable $y$. The population regression line for $p$ explanatory variables $X_1, X_2, ..., X_p$ is defined to be:

$$
\mu_y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_p X_p
$$

This line describes how the mean response $\mu_y$ changes with the explanatory variables. The
observed values for y vary about their means $\mu_y$ and are assumed to have the same standard deviation $\sigma$. The fitted values $b_0, b_1, ..., b_p$ estimate the parameters $\beta_0, \beta_1, ..., \beta_p$ of the population regression line.

Since the observed values for y vary about their means $\mu_y$ the multiple regression model includes a term for this variation. In other words, the model is expressed as $\text{DATA} = \text{FIT} + \text{RESIDUAL}$, where the "FIT" term represents the expression $\mu_y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_p x_p$, the "RESIDUAL" term represents the deviations of the observed values y from their means $\mu_y$, which are normally distributed with mean 0 and variance $\sigma$. The notation for the model deviations is $\varepsilon$.

Formally, the model for multiple linear regressions, given n observations, is:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_p x_p + \varepsilon_i \text{ for } i = 1, 2, ..., n.$$  

In the least-squares model, the best-fitting line for the observed data is calculated by minimizing the sum of the squares of the vertical deviations from each data point to the line (if a point lies on the fitted line exactly, then its vertical deviation is 0). Because the deviations are first squared, then summed, there are no cancellations between positive and negative values. The values fit by the equation $b_0, b_1 x_i, ..., b_p x_{ip}$ are denoted by $\hat{y}_i$, and the residuals $\varepsilon_i$ are equal to $y_i - \hat{y}_i$, the difference between the observed and fitted values. The sum of the residuals is equal to zero. The variance $\sigma^2$ may be estimated by $s^2 = \frac{\sum \varepsilon^2}{n-p-1}$.

3.8.2. Checking Model Adequacy

The coefficient of multiple determination $R^2$ is computed as the ratio of variation in y accounted for by the regression model and the total variation in y. The $R^2$ is therefore,
interpreted as the proportion of total variation of that can be explained by the regression is a number between 0 and 1 (Cornell & Berger, 1987). The larger $R^2$, the better fit the model has. If $R^2 = 1$, then the model has a perfect fit. Define a residual $\hat{\varepsilon}$ as the difference between the observed $y$ and fitted $\hat{y}_i$, that is, $\hat{\varepsilon} = y - \hat{y}_i$. Residuals are interpreted as estimates of random errors $\varepsilon_i$. Therefore, to check if the model assumptions are met (Normality, mean zero and homoscedasticity), residual analysis (also called model validation, model adequacy check or model diagnostic) was performed.

3.8.3. Purpose for Multiple Linear Regressions Model

The crucial limitation of linear regression is that it cannot deal with dependent variables that are dichotomous and categorical. A range of regression techniques has been developed for analysing data with categorical independent variables, including logistic regression (logit regression) and discriminant analysis (DA). Multiple linear regressions are regularly used rather than logit regression and discriminant analysis when there is only one category of the dependent variable (Donn & Donn, 2007).

Multiple Linear regression forms a best fitting equation or function using the maximum likelihood method, which maximizes the probability of classifying the observed data into the appropriate category given the regression coefficients. Residual plots are the most significant diagnostic plots that can be made to check the assumptions in the model (Donn & Donn, 2007). It was used to measure the following assumptions:

- Heteroscedasticity of the predictors.
- Linearity, thus if the data fits the value-added model very well.
- Normality of the error term in the model.
3.9. Quality Assurance

A data entry screen was designed using EPI-INFO® version 7.2.1.0 and programmed to ensure data quality and credibility. Five research assistants were trained on the usage of the questionnaire and how to obtain consent from the participants to make sure that, quality data was collected. The research assistants role-played to get themselves abreast with the questionnaire before they were deployed to the field to collect data.

3.10. Ethical Considerations

Different strategies were applied to ensure that data collection followed appropriate ethical standards in the conduct of the study.

Ethical Clearance

Ethical approval was obtained from the Ghana Health Service Local Ethics Review Committee (GHS-ERC) to ensure the protection of all study subjects. The GHS-ERC was selected because the study was conducted in GHS facilities with the staff of GHS being the study participants. The ethical clearance number assigned to this study was GHS-ERC: 64/02/17.

Approval from the study Area

Apart from the ethical approval which was sought from the Ghana Health Service Ethical Review Committee, permission was also sought from the Greater Accra Regional Health Directorate which oversees health administration in the Greater Accra Region under which TMA falls. Approval was also sought from the Tema Metropolitan Health Directorate which oversees Health Administration in the Tema Metropolis

Description of the Study Subject

Participants in the study were recruited voluntarily and signed two informed consent forms.
One of the consent forms were given to the study participant’s whiles the other copy was kept as part of study records.

Data Storage and Usage

All study records related to this research was stored under lock and key to protect participant’s interest and also to ensure confidentiality.

Risks

There were no risks of participating in the study, but participants had the propensity to feel uncomfortable answering questions, which were about their commitment. This was mitigated by ensuring confidentiality of the responses that were generated and de-identifying all the questionnaires.

Participants’ consent

Participants consented to take part in the study using a written consent form before they were recruited. All consent forms were sealed and placed under lock and key to prevent any third party from coming into contact with either the consent forms or the questionnaires (see Appendix A).

Right to withdraw from the study

Participants were made to understand that, they could withdraw from the study at any point in time as it was completely voluntary.

Compensation

There was no compensation or payment to participants for participating in the study.

Conflict of interest

There was no conflict of interest declared in the study.
Funding information

The research was funded mainly by the researcher with a bursary from the Government of Ghana through the University of Ghana Graduate School, which is duly acknowledged.

3.11. Summary of the chapter

This chapter provided details on how the study was conducted. An overview of the study design, the study location, sampling approach, study variables, data collection approach as well as data processing and analysis. The next chapter presents detail analysis of the data that was collected for the study and its results.
CHAPTER FOUR

RESULTS

4.1. Introduction
Data gathered for any research work need to be analysed, interpreted, and presented in a way that would be useful to users of that research in order to make recommendations and conclusions. The procedure for analysing data collected has been described in the previous chapter. The actual output of analyses and the corresponding discussion are presented in this chapter in line with stated objectives in chapter one. These outputs are gathered from different tests; quantitative analysis conducted towards answering the research questions. The chapter commences with a presentation of the frequency distribution of respondents’ socio-demographic characteristics/managers’ factors (sex, working experience, among others) and ever received DHIMS2 training, which the researcher wanted to use to establish the impact of commitment to data usage for decision making (MEASURE-Evaluation, 2010). Afterwards, a tabular presentation of summary statistics attained for each of the identified factors from the survey is presented. These figures showed whether each factor was of any importance to the managers’ commitment to data usage or not when the mean scores were placed on the Likert scale used in the survey.

4.2. Demographic Characteristics of Respondents
This section presents the results relating to the demographic characteristics of the study respondents.
Table 4.1: Demographic Characteristics of respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>44</td>
<td>66.7</td>
<td>67</td>
<td>66.7</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>33.3</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 – 40</td>
<td>10</td>
<td>15.2</td>
<td>15</td>
<td>15.2</td>
</tr>
<tr>
<td>41 – 50</td>
<td>25</td>
<td>37.9</td>
<td>38</td>
<td>53</td>
</tr>
<tr>
<td>51 – 60</td>
<td>31</td>
<td>47</td>
<td>47</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Educational Qualification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O level</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>A level</td>
<td>4</td>
<td>6.1</td>
<td>6</td>
<td>9.1</td>
</tr>
<tr>
<td>Tertiary</td>
<td>14</td>
<td>21.2</td>
<td>21</td>
<td>30.3</td>
</tr>
<tr>
<td>Professional</td>
<td>12</td>
<td>18.2</td>
<td>18</td>
<td>48.5</td>
</tr>
<tr>
<td>Diploma/Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>34</td>
<td>51.5</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Source: Field Data 2017**

4.2.1. Sex distribution of respondents

Table 4.1 shows the results of the sex distribution of the respondents. It could be observed that most of the senior managers of the hospitals were males, 44 (67%) relative to females who constituted 22 (33%).
4.2.2. Age distribution of respondents

Table 4.1 outlines the results of the age distribution of respondents. It was found that most of the respondents were in the age range 51-60 years, 31 (47%) of the entire sample size. This was followed by individuals in the age range 41-50 years, 25 (38%). The respondents within the age group of 30-40 years were fewer, 10 (15%).

4.2.3. Educational Qualification of Respondents

Results of the educational qualification of the respondents are indicated in Table 4.1. Respondents with Ordinary level education were 2 (3%) while those with Advanced level education were 2 (6%). Additionally, respondents with professional/diploma/degree were 12 (18%) and those with other qualifications were also 34 (52%). However, respondents with tertiary educational qualification were 14 (21%).

4.2.4. Respondents’ Experience with DHIMS2 Data

Table 4.2 presents results of respondents’ duration of experience with DHIMS2 data. It was observed that respondents who had held their various positions for 4-6 years were 27 (40.9%) and those who had held their positions for 7-10 years recorded the same frequency of 27 (40.9%). Senior managers who had been in their positions for 1-3 years were 12 (18.2%). Majority of the senior managers said ‘yes’ they had ever been trained in DHIMS2 data, 34 (51.5%) whereas 32 (48.5%) said ‘no’ they had never been trained in DHIMS2 data. Out of the total number of respondents, 36 (54.5%) indicated ‘no’ to the fact that they had not had further training in DHIMS2 data while 30 (45.5%) indicated ‘yes’ to the fact that they had had further training in the DHIMS2 data.
### Table 4.2: Respondents Experience with DHIMS2 Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years' in Current Position</td>
<td>1-3 years</td>
<td>12</td>
<td>18.2%</td>
</tr>
<tr>
<td></td>
<td>4-6 years</td>
<td>27</td>
<td>40.9%</td>
</tr>
<tr>
<td></td>
<td>7-10 years</td>
<td>27</td>
<td>40.9%</td>
</tr>
<tr>
<td>Ever trained in DHIMS 2</td>
<td>Yes</td>
<td>34</td>
<td>51.5%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>32</td>
<td>48.5%</td>
</tr>
<tr>
<td>Further training in DHIMS 2</td>
<td>Yes</td>
<td>30</td>
<td>45.5%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>36</td>
<td>54.5%</td>
</tr>
</tbody>
</table>

**Source:** Field Data 2017

#### 4.3. Behavioural Factors Influencing Commitment to the Use of DHIMS2 Data for Decision Making in Maternal and Neonatal Health

In the survey, respondents were asked to state the extent to which they agree or disagree with the under listed factors that contribute to commitment to data usage. From the bar chart in Figure 4.1, it can be observed that 10 (15.2%) of the respondents ‘strongly agree’ that senior managers’ commitment level to the usage of the DHIMS2 data could be influenced by personal willingness, whereas 15 (22.7%) ‘disagree’. This was followed by 16 (24.2%) who ‘agree’ that personal likeliness is an influence that is associated with the use of DHIMS2 data. While 13 (19%) were ‘uncertain’, 16 (24.2%) ‘strongly disagree’ that decision making relative to maternal and neonatal health requires strict adherence to and compliance with the use of DHIMS2 data.

Moreover, in as much as 19 (28.8%) ‘strongly agree’, 17 (25.8) ‘agree’ that superiors’ directives determine whether DHIMS2 data should be used for decision making on maternal and neonatal health. Additionally, whereas 23 (34.8%) ‘strongly disagree’, 17 (25.8%) of the
respondents ‘disagree’ that evidence or facts to their commitment to data usage is a factor that drives their commitment level.

With no exception of inter-organizational political interference, 19 (28.8) ‘strongly disagree’ while 17 (25%) of the senior managers ‘disagree’ that inter-organizational political interference was a determinant to their commitment level to the usage of the DHIMS2 data for decision making.

With regards to the three remaining predictor variables associated with senior managers’ commitment level to the use of the DHIMS2 data for decision making on maternal and neonatal health, which are; comparing data with strategic health objectives, health needs, and consideration of cost, the results showed that 21 (31.8%) ‘strongly agreed’, 19 (28.8%) ‘agree’, 22 (33.3%) ‘strongly agree’, 17 (25.8%) ‘agree’, 19 (28.8%) ‘agreed’ and 16 (24.2%) of the respondents ‘strongly agreed’ respectively as indicated above. These behavioural factors were analysed jointly due to their inter-relatedness.

For the purpose of being in accordance with the general research objective; to examine factors that contribute to senior managers’ commitment to the use of DHIMS2 data for decision-making relating to maternal and neonatal health, the predictor variables that were “strongly agreed” and “agreed” to were considered as the factors that were associated with the use of DHIMS2 data for decision making in the Greater Accra Region, whereas those factors that were “strongly disagreed”, “disagreed” to and “uncertain” were not considered as ascertained by the senior managers.
4.4. Organizational Factors Influencing Commitment to the Use of DHIMS2 Data for Decision Making in Maternal and Neonatal Health

From figure 4.2, it can be seen that 18 (27.3%) of the respondents strongly agreed and the same proportion agreed that seeking feedback from concerned persons facilitates the DHIMS2 data management and utilization by senior managers. However, 10 (15.2%) and 9 (13.6%) in the hospitals in the Tema Metropolitan Assembly area of the Greater Accra Region were strongly against the fact that seeking feedback from concerned persons encourage the DHIMS2 data management and utilization by senior managers.

Among the 66 questionnaires administered, 17 (25.8%) of the senior managers indicated ‘strongly agree’ and 21 (31.8%) also ‘agreed’ that one of the predictors that establishes a relationship between the DHIMS2 data management and utilization was the emphasis on data quality in monthly reports. Nevertheless, 9 (13.6%) were ‘uncertain’, 9 (13.6%) ‘strongly
disagreed’ and 9 (13.6%) ‘disagreed’ to this suggestion.

Among the respondents, 3 (4.5%), 6 (9.1%), 12 (18.2%), 24 (36.4%) and 21 (31.8%) showed ‘strongly agreed’, ‘agreed’, ‘uncertain’, ‘strongly disagreed’ and ‘disagreed’ respectively to the view that discussing conflicts openly to resolve them as a predictive variable was not true for establishing a relationship between the DHIMS2 data management and utilization.

In addition, 13 (19.7%), 6 (9.1%), 12 (18.2%), 15 (22.7%) and 20 (30.3%) indicated that they strongly agreed, agreed, uncertain, strongly disagreed and disagreed respectively to the view that seeking feedback from concerned communities as a predictive variable was not true for establishing a relationship between the DHIMS2 data management and utilization.

Furthermore, 24 (36.4%) and 18 (27.3%) of the respondents indicated that they strongly agreed and agreed respectively compared to 6 (9.1%) and 8 (12.1%) of the respondents who indicated that they strongly disagreed and disagreed respectively to the fact that the use of DHIMS2 data for setting targets and monitoring was a factor that could be used to establish a relationship between the DHIMS2 data usage and management.

It was observed that 19 (28.8%) disagreed and 18 (27.3%) strongly disagreed while 5 (7.6%) and 5 (7.6%) strongly agreed and agreed respectively that, checking data quality at the facility and higher level regularly was of any relevance for establishing a relationship between the DHIMS2 data management and utilization. Meanwhile, 19 (28.8%) were uncertain.

With respect to both regular provision of feedback to their staff through regular reports based on evidence and reports on data accuracy regularly, the results showed that respondents strongly agreed, 18 (27.3), and 15 (22.7) agreed accordingly as having an influence on establishing a relationship between the DHIMS2 data management and utilization.
4.5. Multiple Linear Regressions

This section presents the results of the multiple linear regression, which is a statistical method for analysing a dataset in which there are one or more independent variables that determine an outcome. The outcome was measured with a dichotomous variable (in which there are only two possible outcomes). The results for the key variables used have been presented below.

4.5.1. Chi-Square Test: Relationship between Individual or Socio-Demographic Factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

The Table 4.3 below shows the significant value of 0.021, which is less than a 0.05 level of significance. This implies that the null hypothesis was rejected, indicating that there was
enough evidence to support the claim that, there was no significant relationship between demographic characteristics and senior managers’ commitment to data utilization for decisions on maternal and neonatal health. It would be recalled that the hypothesis was stated as:

H0: There is no significant relationship between senior managers’ commitment to data usage and demographic factors.

H1: There exists a significant relationship between senior managers’ commitment to data usage and demographic factors.

The test statistic for the hypothesis was Pearson Chi-Square test with \((2-1) \times (2-1) = 1\) degree of freedom.

4.5.2. Estimated Regression Coefficient: Relationship between Behavioural Factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

It would be seen from table 4.3, that variables such as: personal liking to use the DHIMS2 data to make decisions on maternal and neonatal health \((b = 0.210)\), superior’s directives to use DHIMS2 data \((b = 0.086)\), comparing data with strategic health objectives on maternal and neonatal health \((b = 0.125)\), health needs \((b = 0.047)\), consideration of costs \((b = 0.223)\), showed a positive direct relationship between senior managers’ commitment to use the DHIMS2 data and decision making on maternal and neonatal health. However, it was shown that variables such as inter-organizational political interference \((b = -0.158)\) and evidence or fact \((b = -0.194)\) had a negative indirect relationship between senior managers’ commitment levels and the use of the DHIMS2 data for decision making on maternal and neonatal health.

Moreover, this model showed that variables such as personal likeliness to use DHIMS2 data, \(t (332) = 1.312, p < .01\), superior’s directives to use DHIMS2 data, \(t (332) = .228, p < .05\),
comparing data with strategic health objectives on maternal and neonatal health, \( t (332) = .544, p< .05 \), and considering costs, \( t (332) = 1.308, p< .01 \), were significant predictors of senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

From the magnitude of the t-statistics, it could be noticed that personal liking and cost consideration had slightly more impact than superior’s directives and comparing data with strategic health objectives to use DHIMS2 data for decision-making regarding maternal and neonatal health.

The results showed that independent factors like evidence or facts that senior managers use data \( t (332) = -.755, p> .05 \), inter-organizational political interference to use DHIMS2 data \( t (332) = -.839, p>.05 \) and health needs \( t (332) = .276, p> .05 \), were insignificant predictors of senior managers’ commitment level to the use of DHIMS2 data for decision-making with respect to maternal and neonatal health. Whereas there was insignificant/insufficient evidence that these three predictors could influence senior managers to use the DHIMS2 data, it could be argued that health needs could be factored into the equation since it had a significance level of .052, which is equivalent to \( p = .05 \).
Table 4.3: Estimated Regression Coefficient: Relationship between behavioural factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>3.289</td>
<td>0.972</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td>Personal Liking of Senior Managers to use DHIMS2 Data</td>
<td>0.21</td>
<td>0.16</td>
<td>0.173</td>
</tr>
<tr>
<td></td>
<td>Superiors’ directives to use DHIMS2 Data</td>
<td>0.086</td>
<td>0.378</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Evidence or facts</td>
<td>-0.158</td>
<td>0.21</td>
<td>-0.104</td>
</tr>
<tr>
<td></td>
<td>Inter organizational political interference</td>
<td>-0.194</td>
<td>0.232</td>
<td>-0.109</td>
</tr>
<tr>
<td></td>
<td>Comparing data with strategic health objectives on maternal and neonatal health</td>
<td>0.125</td>
<td>0.23</td>
<td>0.071</td>
</tr>
<tr>
<td></td>
<td>Health needs</td>
<td>0.047</td>
<td>0.171</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>Considering costs</td>
<td>0.223</td>
<td>0.17</td>
<td>0.171</td>
</tr>
</tbody>
</table>

Source: Field Data, 2017.
4.5.3. Chi-Square Test: Relationship between behavioural factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

Table 4.4 indicates a Pearson Chi-Square value of 4.001 with a respective significant value of 0.06. Since the significant value was greater than a significance level of 0.05, it failed to reject the null hypothesis. Therefore, it was concluded that, there was a sufficient evidence to support the claim that senior managers’ commitment was influenced by the behavioural factors on DHIMS2 data usage. The hypothesis was stated as:

H0: There is no significant relationship between senior managers’ commitment to data usage and behavioural factors.

H1: There exists a significant relationship between senior managers’ commitment to data usage and behavioural factors.

The test statistic for the hypothesis was Pearson Chi-Square test with \((2-1)\times(2-1) = 1\) degree of freedom.

Table 4.4: Chi-Square Test: Relationship between behavioural factors and DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>4.001</td>
</tr>
<tr>
<td>Degree of freedom</td>
<td>1</td>
</tr>
<tr>
<td>Significant value</td>
<td>0.066</td>
</tr>
</tbody>
</table>

Source: Field Data, 2017.
4.5.4. ANOVA: Analysis of Variance of the influence of Behavioural Factors of Senior Managers’ Commitment on DHIMS2 Data Utilization

The output contains an analysis of variance (ANOVA) that tests whether the model was significant or better at predicting the outcome than using the mean as a ‘best guess’. From table 4.6, it was seen that the significance ‘F’ was 0.039, which is less than 5% level of significance. Thus, the test can be assumed to be highly significant to the model with (p<0.05). This means that the final model significantly improves the ability to predict the outcome variable or in other words, there was enough evidence to support the claim that, predictors such as personal liking, superiors’ directives, comparing data with strategic health objectives, health needs, and considering cost, were significant to the model.

From table 4.5, the fitted model after controlling for the confounders in the model could be summarized as: \( y = f(\beta_1, \beta_2, \beta_3, \beta_4, \beta_5) \), with \( \beta_1 \) being personal liking, \( \beta_2 \) being superior’s directive, \( \beta_3 \) being comparing data with strategic health objectives, \( \beta_4 \) being health needs and \( \beta_5 \) cost consideration. Hence, senior managers’ commitment level to the use of DHIMS2 Data was expressed as: \( y = (3.195 + 0.210 \chi_1 + 0.86 \chi_2 + 0.125 \chi_3 + 0.047 \chi_4 - 0.223 \chi_5) \).

The results are written as: \( y = 3.195 + 0.210 \chi_1 + 0.86 \chi_2 + 0.125 \chi_3 + 0.047 \chi_4 - 0.223 \chi_5 \).
Table 4.5: ANOVA: Analysis of Variance of the influence of Behavioural Factors of Senior Managers’ Commitment on DHIMS2 Data Utilization

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>28.256</td>
<td>7</td>
<td>4.037</td>
<td>.705</td>
<td>.039</td>
</tr>
<tr>
<td>Residual</td>
<td>332.108</td>
<td>58</td>
<td>5.726</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360.364</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data, 2017.

4.5.5. Chi-Square Test: Challenges to Senior Managers’ Commitment to the Use of DHIMS2 Data

Table 4.6 indicates a Pearson Chi-Square value of 4.156 with a respective significant value of 0.041. Since the significant value was greater than a significance level of 0.05, it failed to reject the null hypothesis. Therefore, it was concluded that, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the challenges in data usage. The hypothesis was stated as:

H₀: There is no significant relationship between senior managers’ commitment and challenges on data usage.

H₁: There exists a significant relationship between senior managers’ commitment and challenges on data usage.

The test statistic for the hypothesis above is Pearson Chi-Square test with (2-1)*(2-1) = 1 degree of freedom.
**Table 4.6: Chi-Square Test:** Challenges to Senior Managers’ Commitment to the Use of DHIMS2 Data

<table>
<thead>
<tr>
<th>Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>4.156</td>
</tr>
<tr>
<td>Degree of freedom</td>
<td>1</td>
</tr>
<tr>
<td>Significant value</td>
<td>0.041</td>
</tr>
</tbody>
</table>

*Source: Field Data, 2017.*

### 4.6. Estimated Regression Coefficient: Relationship between Organizational Factors and Senior Managers’ Commitment Level to DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

The results in table 4.7 indicate that out of the eight predictor variables, exactly four or half had a positive direct relationship with senior managers’ commitment level to the use of DHIMS2 data and data generation whereas the other half represents an indirect negative relationship with senior managers’ commitment level to usage of the DHIMS2 data and its generation. The following parameters indicated the predictors with positive relationships and those with negative relationship respectively: seeking feedback from concerned persons (b = 0.205), emphasize data quality in monthly reports (b = 0.238), discuss conflicts openly to resolve them (b = 0.299), seek feedback from concerned community (b = 0.150), use DHIMS2 data for setting targets and monitoring (b = -0.464), check data quality at the facility and higher level regularly (b = -0.135), provide regular feedback to their staff through regular reports based on evidence (b = -0.053), and report on data accuracy regularly (b = -0.095).
However, it would be recalled from table 4.8 that, the model was significant at seeking feedback from concerned persons, $t(253) = 1.337$, $p<.01$, emphasize data quality in monthly reports, $t(253) = 1.725$, $p<.05$, use DHIMS2 data for setting targets and monitoring, $t(253) = -3.362$, $p<.01$, provide regular feedback to their staff through regular reports based on evidence $t(253) = -0.349$, $p<.05$, and report on data accuracy regularly $t(253) = -0.651$, $p<.05$. In addition, it was seen that, the model experienced insignificant predictors relative to discussion of conflicts openly to resolve them $t(253) = 1.818$, $p>.05$, seek feedback from concerned community $t(253) = 1.033$, $p>.05$, and check data quality at the facility $t(253) = -0.800$, $p>.05$. 
Table 4.7: Estimated Regression Coefficient: Relationship between Organizational Factors and Senior Managers’ Commitment Level to DHIMS2 Data Utilization for Decision Making on Maternal and Neonatal Health

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>4.907</td>
<td>1.857</td>
<td>2.642</td>
</tr>
<tr>
<td></td>
<td>Seeking feedbacks from concerned persons</td>
<td>0.205</td>
<td>0.153</td>
<td>0.155</td>
</tr>
<tr>
<td></td>
<td>Emphasize data quality in monthly reports</td>
<td>0.238</td>
<td>0.138</td>
<td>0.202</td>
</tr>
<tr>
<td></td>
<td>Discuss conflicts openly to resolve them</td>
<td>0.299</td>
<td>0.164</td>
<td>0.219</td>
</tr>
<tr>
<td></td>
<td>Seek feedback from concerned community</td>
<td>0.15</td>
<td>0.145</td>
<td>0.124</td>
</tr>
<tr>
<td></td>
<td>Use DHIMS 2 data for setting targets and monitoring</td>
<td>-0.464</td>
<td>0.138</td>
<td>-0.417</td>
</tr>
<tr>
<td></td>
<td>Check data quality at the facility and higher level regularly</td>
<td>-0.135</td>
<td>0.168</td>
<td>-0.094</td>
</tr>
<tr>
<td></td>
<td>Provide regular feedback to their staff through regular report based on evidence</td>
<td>-0.053</td>
<td>0.152</td>
<td>-0.042</td>
</tr>
<tr>
<td></td>
<td>Report on data accuracy regularly</td>
<td>-0.095</td>
<td>0.146</td>
<td>-0.075</td>
</tr>
</tbody>
</table>

Source: Field Data, 2017.
4.6.1. Analysis of Variance of the Relationship between Organizational Factors and Senior Managers’ Commitment to DHIMS2 Data Utilization

Table 4.8 shows the output of the ANOVA analysis and whether there was a statistically significant difference between a group means. It could be seen that the value of significance was 0.006 (p = .006), which is below 0.01 and, therefore, there was a statistically significant difference in the mean of senior managers using the DHIMS2 data and its generation. Thus, the null hypothesis was rejected, indicating that there was enough evidence to support the claim that, senior managers’ commitment to data use was associated with the relationship that exists between data generation and actual utilization of the data. It would be recalled that the hypothesis was set as below:

H0: There is no significant relationship between organizational factors and senior managers’ commitment to data usage and its generation.

H1: There exists a significant relationship between organizational factors and senior managers’ commitment to data usage and its generation.

It could be seen from table 4.8 that, after controlling for the confounders, the fitted model could be summarized as: y = f (β1, β2, β3, β4, β5), with β1 being seeking feedback from concerned persons, β2 being emphasize data quality in monthly reports, β3 being the use of DHIMS2 data for setting targets and monitoring, β4 being provision of regular feedback to their staff through regular reports based on evidence and β5 being report on data accuracy regularly.

Thence, senior managers’ commitment level to DHIMS2 data utilization was (y) = (4.907 + 0.205 (seeking feedback from concerned persons) + 0.238 (emphasize data quality in monthly
reports) - 0.464 (use DHIMS2 data for setting targets and monitoring) – 0.053 (provide regular feedback to their staff through regular reports based on evidence) – 0.095 (report on data accuracy regularly).

The results are presented as: 
\[ y = 4.907 + 0.205 \chi_1 + 0.238 \chi_2 - 0.464 \chi_3 - 0.053 \chi_4 - 0.095 \chi_5 \]

### Table 4.8: Analysis of Variance of the Relationship between Organizational Factors and Senior Managers’ Commitment to DHIMS2 Data Utilization

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>107.696</td>
<td>8</td>
<td>13.462</td>
<td>3.037</td>
<td>.006*</td>
</tr>
<tr>
<td>Residual</td>
<td>252.668</td>
<td>57</td>
<td>4.433</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360.364</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data 2017.

### 4.6.2. Chi-Square Test: Organizational Factors and Senior Managers’ Commitment to the Utilization of DHIMS2 Data

Table 4.9 indicates a Pearson Chi-Square value of 3.273 with a respective significant value of 0.070. Since the significant value was greater than a significance level of 0.05, it failed to reject the null hypothesis. Therefore, it was seen that, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the organisational factors in data usage. The hypothesis was stated as:

\[ H_0: \text{There is no significant relationship between senior managers’ commitment to data usage and organisational factors.} \]
H$_1$: There exists a significant relationship between senior managers’ commitment to data usage and organisational factors.

The test statistic for the hypothesis above is Pearson Chi-Square test with (2-1)*(2-1) = 1 degree of freedom.

Table 4.9: Chi-Square Test: Organizational Factors and Senior Managers’ Commitment to the Utilization of DHIMS2 Data

<table>
<thead>
<tr>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
</tr>
<tr>
<td>Degree of freedom</td>
</tr>
<tr>
<td>Significant value</td>
</tr>
</tbody>
</table>

Source: Field Data, 2017.

4.7. Estimated Regression Coefficient: Challenges Associated with Senior Managers’ Commitment to the use of DHIMS2 Data

Table 4.10 shows the results relating to the fact that, the inability of senior managers to use DHIMS2 data for their day to day management of maternal and neonatal health in the facility and metropolis was at [$t(274) = -0.458$, $b = -0.129$, $p > .05]$], and senior managers did not display DHIMS2 data for monitoring their set targets on maternal and neonatal health at [$t(274) = -1.686$, $b = -0.413$, $p > .05]$]. Furthermore, the inability of senior managers to say no to superiors and colleagues regarding decisions not supported by evidence on maternal and neonatal health was at [$t(274) = 0.280$, $b = -0.043$, $p > .05]$], and the admission of mistakes for taking corrective actions on maternal and neonatal related issues was at [$t(274) = -1.679$, $b = -0.417$, $p > .05]$]. These posed a negative indirect relationship and insignificant prediction
to the model.

However, indicators such as: senior managers not being able to develop an appropriate criteria for selecting interventions for a given problem with specific reference to maternal and neonatal health, senior managers inability to evaluate whether the targets or outcomes had been achieved, senior managers not-empowered to make decisions on maternal and neonatal matters, and senior managers do not use DHIMS2 Data for community education and mobilization on maternal and neonatal health revealed a positive direct relationship and significant prediction to the model at \( t (274) = -2.018, b = 0.476, p > .05 \), \( t (274) = 0.773, b = 0.184, p > .05 \), \( t (274) = 0.874, b = 0.196, p > .05 \), and \( t (274) = 0.307, b = 0.089, p > .05 \) respectively. Meanwhile, the analysis showed that both senior managers’ inability to gather data to find the root cause of the problem, and develop appropriate outcomes for a particular intervention had a negative indirect relationship with the model but highly significant at \( t (274) = -1.77, b = -0.648, p > .05 \) and \( t (274) = -0.195, b = 0.196, p > .05 \).
### Table 4.10: Estimated Regression Coefficient: Challenges Associated with Senior Managers' Commitment to the use of DHIMS2 Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>8.349</td>
<td>3.606</td>
<td>2.316</td>
</tr>
<tr>
<td></td>
<td>Do not use DHIMS2 data for day to day management of the facility and district</td>
<td>-0.129</td>
<td>0.283</td>
<td>-0.063</td>
</tr>
<tr>
<td></td>
<td>Do not display for monitoring for their set target</td>
<td>-0.413</td>
<td>0.245</td>
<td>-0.217</td>
</tr>
<tr>
<td></td>
<td>Cannot gather data to find the root cause of the problem</td>
<td>-0.648</td>
<td>0.365</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>Cannot develop appropriate criteria for selecting interventions for a given problem</td>
<td>0.476</td>
<td>0.236</td>
<td>-0.263</td>
</tr>
<tr>
<td></td>
<td>Cannot develop appropriate outcomes for a particular intervention</td>
<td>-0.195</td>
<td>0.22</td>
<td>-0.128</td>
</tr>
<tr>
<td></td>
<td>Cannot evaluate whether the targets or outcomes have been achieved</td>
<td>0.184</td>
<td>0.239</td>
<td>0.103</td>
</tr>
<tr>
<td></td>
<td>Are not empowered to make decisions</td>
<td>0.196</td>
<td>0.224</td>
<td>-0.145</td>
</tr>
<tr>
<td></td>
<td>Are not able to say no to superiors and colleagues for decisions not supported by evidence</td>
<td>-0.043</td>
<td>0.155</td>
<td>-0.039</td>
</tr>
<tr>
<td></td>
<td>Do not use DHIMS 2 Data for community education and mobilization</td>
<td>0.089</td>
<td>0.289</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>Admit mistakes for taking corrective actions</td>
<td>-0.417</td>
<td>0.248</td>
<td>-0.242</td>
</tr>
</tbody>
</table>

**Source:** Field Data, 2017.
4.8. Analysis of Variance on Challenges Associated with Senior Managers’ Commitment to the use of DHIMS2 Data Usage

It would be seen from table 4.11 that the significant value was .014 ($p = .014$), which is below 0.01. Therefore, there was a statistically significant evidence that there was a relationship in the mean of the challenges associated with senior managers’ commitment to usage of DHIMS2 data for decision making on maternal and neonatal health. This as well implies that the null hypothesis was rejected, indicating that there was enough evidence to support the claim that, senior managers’ commitment to DHIMS2 data use was associated with the relationship that exists between data challenges and actual utilization of the data. It would be recalled that the hypothesis was denoted as:

$H_0$: There is no significant relationship between senior managers’ commitment and challenges to data usage.

$H_1$: There exists a significant relationship between senior managers’ commitment and challenges to data usage.

From Table 4.11, it could be seen that after controlling for the confounders in the model, the fitted model could be summarized as: $y = f(\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6)$, with $\beta_1$ being cannot develop appropriate criteria for selecting interventions for a given problem, $\beta_2$ being cannot gather data to find the root cause of the problem, $\beta_3$ being cannot develop appropriate outcomes for a particular intervention, $\beta_4$ being cannot evaluate whether the targets or outcomes have been achieved, $\beta_5$ being are not empowered to make decisions and $\beta_6$ being do not use DHIMS2 Data for community education and mobilization.
Consequently, senior managers’ challenges with DHIMS2 Data usage is provided as (y) = (8.349 + 0.476 (cannot develop appropriate criteria for selecting interventions for a given problem) – 0.648 (cannot gather data to find the root cause of the problem) – 0.195 (cannot develop appropriate outcomes for a particular intervention) + 0.184 (cannot evaluate whether the targets or outcomes have been achieved) + 0.196 (are not empowered to make decisions) + 0.089 (do not use DHIMS2 Data for community education and mobilization).

The results are written as: \( y = 8.349 + 0.476 \chi_1 - 0.648 \chi_2 - 0.195 \chi_3 + 0.184 \chi_4 + 0.196 \chi_5 + 0.089 \chi_6. \)

**Table 4.11: Analysis of Variance on Challenges Associated with Senior Managers’ Commitment to the use of DHIMS2 Data Usage**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>86.254</td>
<td>10</td>
<td>8.625</td>
<td>1.731</td>
<td>.014b</td>
</tr>
<tr>
<td>Residual</td>
<td>274.109</td>
<td>55</td>
<td>4.984</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360.364</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Field Data, 2017.*

**4.9 Chapter Summary**

This chapter presented the analysis and discussion of the outcomes, which were acquired from the research. The results obtained from this study showed the consistency in results obtained in this study on the factors causing the ability or inability of senior managers to utilize DHIMS2 data for decision making. Linear multiple regression method was employed to rank the factors causing commitment among senior managers to the use of district health information management system 2 data (DHIMS2) for decision making in relation to
maternal and neonatal health in the Greater Accra Region. Cronbach's Alpha test was conducted to check the reliability of results from the effects on managers’ commitment level. The next chapter unveils the discussions of the research results in relation to extant literature.
CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1. Introduction

This chapter presents the relationship of the findings of the study on senior managers’ commitment level to data utilization relative to decision making on maternal and neonatal health with extant literature. The chapter is divided into five sections.

5.2. Influence of demographic characteristics on senior managers’ usage of DHIMS2 Data

The study showed that the significant value of 0.021 was less than a 0.05 level of significance. This implied that the null hypothesis was rejected, indicating that there was enough evidence to support the claim that, there was no significant relationship between demographic characteristic and senior managers’ commitment to data utilization for decisions on maternal and neonatal health. Thus, the test statistic for the hypothesis was Pearson Chi-Square test with \((2-1)*(2-1) = 1\) degree of freedom. This finding is similar to a study where in evaluating the PRISM framework in Uganda Hotchkiss et al. (2010), found that, the promotion of evidence-based decision was not based on socio-economic factors, including, age, marital status, and sex influences of superior’s directives.

The finding of this study revealed that the Tema Metropolitan Assembly in the Greater Accra Region was mostly dominated by senior managers who happened to be males (67%) in the health sector. The average age distribution of senior managers within the region was 47 (38%) years with the highest age range of 51-60 (47%) recorded. In this study, it was as well revealed that some senior managers had never had any training pertaining to the DHIMS2 data management and utilisation (48.5%) whereas most senior managers who had received
training had never received any subsequent or further training (54.5%). This poses more risk for the utilization of the DHIMS2 data for decision making on maternal and neonatal. This case scenario could be attributed to several factors, including biological, and socio-economic that predispose young women to early marriages and pregnancies. According to WHO, (2012), young age coupled with limited access to health information, cultural pressures and little control for decision making lead to high risk pregnancies.

Educational qualification was found to be associated with and influences the use of the DHIMS2 data by senior managers for decision-making on maternal and neonatal health. Senior managers with less educational qualification, O level and A level (12%) made fewer utilization of the data and were unlikely to have the quality within data space and therefore, stood a high risk for duplicating, misinterpreting, data accuracy or precision, and inconsistencies compared to the other group of senior managers. In this approach, senior managers who had tertiary and other educational level of education (78%) had a higher utilization rate and higher predictive level of skilled delivery than those who had O level and A level education. A study on developing countries by Caldwell and McDonald (1982), also showed the significant effect of increasing data utilization on reducing child mortality. The research noted that the significance of health workers’ maternal education, unavailability and utilization of statistical data on maternal and neonatal health had higher qualified workers/managers adhering more.

5.3. Influence of Behavioural Factors on Senior Managers’ Commitment to the DHIMS2 Data Usage

The study recorded a Pearson Chi-Square value of 4.001 with a respective significant value of 0.066. Since the significant value was greater than a significance level of 0.05, the study
failed to reject the null hypothesis. Therefore, it was found that, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the behavioural factors on DHIMS2 data usage. The study observed that a negative attitude such as ‘data collection is a useless activity or waste of health care providers’ time’ could hinder the performance of RHIS tasks. Earlier researchers have explained that the PRISM framework assumes that if health staff and other users of RHIS comprehend the usefulness of RHIS responsibilities, feel poised and capable in executing the duty, and recognize that the duty's difficulty is stimulating but not overpowering; then they will finish the task diligently (Aqil et al., 2009).

In evaluating the PRISM framework in Uganda, Hotchkiss et al. (2010), found that, the promotion of evidence-based decision making was based on factors, including personal liking of data, superior’s directives, evidence or facts, political interference, strategic objectives, community health needs, considering cost and considering all alternatives and their consequences and data. Similarly, personal liking, superior’s directive, comparing data with strategic health objectives, health needs and cost considering (apart from political interference) were the major drivers of commitment to the use of data among senior managers in this study.

This also supports findings of other studies that showed that a health worker who works directly with data generation, exploration and interpretation, feels about the usefulness or outcomes of a task, or confident in performing that task affected how the task was to be performed (Teklegiorgis et al., 2016). While these five predictors exhibited higher levels of significance, inter-organizational, political interference and evidence or facts recorded lesser significance levels to be a predicting variable and consequently debunks the assertion that health managers use a considerable amount of their working time in generating data for
decision making (Bonenberger et al., 2015).

5.4. Influence of Organizational Factors on Senior Managers’ Commitment to the Utilization of DHIMS2 Data

The study found a Pearson Chi-Square value of 3.273 with a respective significant value of 0.070. Since the significant value was greater than a significance level of 0.05, the study failed to reject the null hypothesis. Therefore, it was concluded that, there was a sufficient evidence to support the claim that senior managers’ commitment was influenced by the organisational factors in data usage.

The major predictors of the usage of DHIMS2 data in this study remained seeking feedback from concerned persons, emphasize data quality in monthly reports, use of DHIMS2 data for setting targets and monitoring, provide regular feedback to their staff through regular reports based on evidence, and reports on data accuracy regularly. Senior managers who tended to seek feedback from concerned persons as well as emphasize on data quality on occasional basis used sources of information for decision making in health, which include research, health systems and more importantly, periodic accounts on data quality. A similar finding has been reported in the literature (Aqil et al., 2009).

Studies argue that the use of information, which is of poor quality in decision-making leads to poor goal setting, appraisal of an alternative course of action and poor planning (Rotich et al., 2003; Kamadjeu, 2005). This study found that the use of DHIMS2 data for setting targets and monitoring, provision of regular feedback to their staff through regular reports based on evidence, and reports on data accuracy regularly affirmed decision-making relative to prediction accuracy and forecasting consistency on maternal and neonatal health in the Tema Metropolitan Assembly of the Greater Accra Region. This finding has a relationship with a
study that reported that the tasks of an institution were directed by the realization of goals, which were influenced by proper planning, managerial creativity and resource availability (Boadu, 2014).

5.5. Influence of Challenges on Senior Managers’ Commitment to the Use of DHIMS2 Data

The study found a Pearson Chi-Square value of 4.156 with a respective significant/significance value of 0.041. Since the significant/significance value was greater than a significance level of 0.05, it failed to reject the null hypothesis. Therefore, it was concluded that, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the challenges in data usage.

This study explored the chances of the DHIMS2 data being used for decision making on maternal and neonatal health. The findings revealed that some of the challenges faced by senior managers in their use of DHIMS2 data were their inability to develop appropriate criteria for selecting interventions for a given problem (p>0.011). Studies observe that DHIMS2 data are frequently ignored for assessing fundamental effects of health interventions due to worries about wholeness, it being on time, representativeness and correctness (Wagenaar, Sherr, Fernandes, & Wagenaar, 2016).

This study revealed the following factors as challenges: gather data to find the root cause of the problem (p>0.026), develop appropriate outcomes for a particular intervention (p>0.048), evaluate whether the targets or outcomes had been achieved (p>0.044), not empowered to make decisions (p>0.044), and did not use DHIMS2 data for community education and mobilization (p>0.021). Other researchers argue that some of the reasons that accounted for the stagnation of data use were attributed to, ‘recognizing and committing resources to
educate the system contributed to low stakeholder buy-in’ (Nutley et al., 2014).

The study argues that the inability of senior managers to develop appropriate criteria for selecting interventions for a given problem was a challenge associated with the use of DHIMS2 data for decision making regarding maternal and neonatal health in the Tema Metropolitan Assembly of the Greater Accra Region. It was found that senior managers not being able to gather data to find the root cause of the problem turned out to be another challenge during decision making on maternal and neonatal health in the region. Moreover, it was revealed that decision making on maternal and neonatal health, was limited by managers’ unwillingness to develop appropriate outcomes for a particular intervention because of managers’ inability to formulate appropriate criteria for selecting interventions during the tendering process in the hospital.

Nutley and Reynolds (2013b), note that certain activities could be carried out to improve data demand and utilization. These include the ability to assess and improve the data use context, discuss and disseminate results of data use interventions, involve data users and data generators, enhance data quality, enhance data accessibility, identify information needs, build capacity in data use core competencies, monitor, evaluate, and strengthen the organization’s data demand and use infrastructure.

Another challenge that was associated with the use of DHIMS2 data for decision making on maternal and neonatal health in the Tema Metropolitan Assembly of the Greater Accra Region was managers’ inability to evaluate whether the targets or outcomes had been achieved. The study found that the challenge of senior managers not being empowered to make decisions was strongly agreed (46%) and agreed (24%) as the highest percentages by
the respondents in the region. The study revealed that senior managers within the metropolis of the region did not use the DHIMS2 data for community education and mobilization, consequently, hindering their commitment level to the use of the data. Useful data for health managers at all levels for planning, budgeting and decision-making has not been timely or complete. As earlier observed, this confirms the findings that some of the reasons that accounted for the stagnation of data use were attributed to: ‘recognizing and committing resources to sustain the system contributed to low stakeholder buy-in’ (Nutley et al., 2014).

5.6. Summary of the chapter

This chapter presented a summary of the findings, which formed part of contributing to the body of knowledge and fills the research and knowledge gap regarding the commitment among senior managers to the use of district health information management system 2 data for decision making in maternal and neonatal health in in the Tema Metropolitan Assembly of the Greater Accra Region. The conclusion, limitation, recommendations, and directions for future research have been noted in the next chapter.
CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter presents a conclusion to the study. It is presented in three sections consisting of a summary of the study, conclusions of the study, and recommendations. The limitations to the study and directions for future research have also been presented.

6.2. Summary of the study

The study was designed to investigate and analyse the management and utilization of District Health Management Information Management System (DHIMS) 2 data in the Tema Metropolitan Assembly of the Greater Accra Region of Ghana. The objectives were to: examine socio-economic/demographic factors that contribute to senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health; assess behavioural factors influencing senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health; examine organisational factors influencing senior managers’ commitment level to the use of DHIMS2 data for decision-making relating to maternal and neonatal health; and challenges associated with the use of DHIMS2 data for decision-making relating to maternal and neonatal health.

The study was conducted in the Tema Metropolitan Assembly of the Greater Accra Region. Data collection methods employed were: documents review, and structured questionnaires. Data from the returned questionnaires were analysed using STATA 14 software. EPI INFO® version 7.2.0.1 was used to capture the data, which was programmed to ignore values, which
fell outside the scale range. This served as a check to ensure quality and credible data. Analysis of research data was done using the descriptive and inferential approach using STATA 14 and Microsoft Excel version 2016. Hence, findings were presented in the form of percentages, graphs, tables, and charts.

Generally, the findings of the study indicated that most health units inherited a very fragmented paper-based information system. The research on senior managers’ commitment level to the utilisation of the District Health Information Management System (DHIMS 2) in TMA in the Greater Accra Region highlighted very significant conclusions. These include: lack of skilled personnel and training for data system personnel; poor record keeping and filing system of reports; poor utilization of data; accuracy of data are untrusted by decision-makers for evidence-based decisions; and poor data precision or accuracy, completeness and timely. The implications of the above include poor decision making, poor prioritization and design of irrelevant health interventions, which negatively affect efficient health care delivery.

6.3. Conclusions of the study

This section presents the conclusions of the study based on the specific objectives. The study was undertaking based on the belief that, the commitment level of senior managers’ to the utilisation of the DHIMS2 data, its management and challenges during decision making on maternal and neonatal health would go a long way to enhance the in TMA in Greater Accra’s performance in terms of forecasting, predicting, analysing, and health care delivery. The specific conclusions have been presented below.
Socio-Economic/Demographic Factors Influencing Senior Managers’ Commitment Level to the Use of DHIMS2 Data for Decision-Making Relating to Maternal and Neonatal Health

The study found a significant value of 0.021, which was less than a 0.05 level of significance. Thus, the study concludes that since the null hypothesis was rejected, there was enough evidence to support the claim that, there was no significant relationship between demographic characteristic and senior managers’ commitment to data utilisation for decisions on maternal and neonatal health. Consequently, the socio-economic/demographic factors influencing senior managers’ commitment level to the utilisation of the District Health Information Management System (DHIMS 2) in TMA in the Greater Accra Region highlighted very significant conclusions. These include: in TMA in the Greater Accra Region was mostly dominated by senior managers who happened to be males (67%) in the health sector; the average age distribution of senior managers within the region was 47 (38%) years with the highest age range of 51-60 (47%); and senior managers with less educational qualification, O level and A level (12%) made fewer utilization of the data and were unlikely to have the quality within data space.

Similarly, it was reported in a study conducted in the West Mamprusi District of the Northern Region of Ghana that respondents constituted 63.6% males and 36.4% females (Ibrahim, 2016). With regards educational status of respondents, the study reported the following: diploma holders (59.1%), degrees (27.3%) and junior technical staff (13.6 %). This argument in this study was confirmed when the researcher implied that most of those who handle data had minimum levels of education and as such, were not able to understand the forms and use the DHIMS effectively, hence the low utilisation of the DHIMS2 in the metropolis.
Influence of Behavioural Factors on Senior Managers’ Commitment Level to the Use of DHIMS2 Data for Decision-Making Relating to Maternal and Neonatal Health

The study found that a Pearson Chi-Square value of 4.001 with a respective significant value of 0.066. Since the significant value was greater than a significance level of 0.05, the study failed to reject the null hypothesis. Therefore, the study concludes that, there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the behavioural factors on DHIMS2 data usage. Influence of behavioural factors on senior managers’ commitment level to utilisation of the District Health Information Management System (DHIMS 2) in TMA in the Greater Accra Region highlighted very significant conclusions. These include: a health worker who works directly with data generation, exploration and interpretation, feels about the usefulness or outcomes of a task, or confident in performing that task affected how the task was to be performed; senior managers use a considerable amount of their working time in generating data for decision making; and political interference to monitor and evaluate data quality was unstructured and untimely.

This supports the findings of Cooper (2006), on impact of management’s commitment of employee behaviour. In a related study, Skiti (2017), examined behavioural and organisational factors that influence use of TIER.net (a three-tiered health information system), and indicated that even though information generated from TIER.net was readily available to facility managers and programme coordinators in the HIV and AIDS/ Sexually Transmitted Infection/TB (HAST) programme, the information was not effectively used to inform programme planning, implementation and monitoring in South Africa.
Influence of Organisational Factors on Senior Managers’ Commitment Level to the Use of DHIMS2 Data for Decision-Making Relating to Maternal and Neonatal Health

The study reported a Pearson Chi-Square value of 3.273 with a respective significant value of 0.070. Since the significant value was greater than a significance level of 0.05, the study failed to reject the null hypothesis. Therefore, the study concludes that there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the organisational factors in data usage. Hence, influence of organisational factors on senior managers’ commitment level to utilisation of the District Health Information Management System (DHIMS 2) in TMA in the Greater Accra Region highlighted very significant conclusions.

These include: senior managers who tended to seek feedback from concerned persons as well as emphasize on data quality on occasional basis used sources of information for decision making in health, which include research, health systems and more importantly, periodic accounts on data quality; the tasks of an institution were directed by the realization of goals, which were influenced by proper planning, managerial creativity and resource availability; and the use of DHIMS2 data for setting targets and monitoring, provision of regular feedback to their staff through regular reports based on evidence, and reports on data accuracy regularly affirmed decision-making relative to prediction accuracy and forecasting consistency on maternal and neonatal health in the Tema Metropolitan Assembly of the Greater Accra Region. This supports the findings of Shiferaw, Zegeye, Assefa and Yenit (2017), which suggest that, data analysis skills, supportive supervision, regular feedback, favourable attitude, and type of health facility were significantly related to good routine health information utilization and decision making.
Challenges Associated with the Use of DHIMS2 Data for Decision-Making Relating to Maternal and Neonatal Health. The study found a Pearson Chi-Square value of 4.156 with a respective significant value of 0.041. Since the significant value was greater than a significance level of 0.05, it failed to reject the null hypothesis. Therefore, the study concludes that there was sufficient evidence to support the claim that senior managers’ commitment was influenced by the challenges in data usage. Challenges associated with senior managers’ commitment level to utilisation of District Health Information Management System (DHIMS 2) in TMA in the Greater Accra Region highlighted very significant conclusions. These include: the challenges faced by senior managers in their use of DHIMS2 data were the inability of senior managers to develop appropriate criteria for selecting interventions for a given problem.

Studies observe that DHIMS2 are frequently ignored for assessing fundamental effects of health interventions due to worries about wholeness, it being on time, representativeness and correctness (GHS, 2015). Similarly, in this study, senior managers not being able to gather data to find the root cause of the problem turned out to be another challenge during decision making on maternal and neonatal health in the metropolis of the region; decision making on maternal and neonatal health, was limited by managers’ unwillingness to develop appropriate outcomes for a particular intervention because of managers’ inability to formulate appropriate criteria for selecting interventions during the tendering process in the hospital; and another challenge that was associated with the use of DHIMS2 data for decision making on maternal and neonatal health in TMA in the Greater Accra Region was managers’ inability to evaluate whether the targets or outcomes had been achieved.

The study concludes that personal liking, superior’s directive, comparing data with strategic health objectives, health needs and cost considering were the major drivers of commitment to
the use of data among senior managers. This supports findings of other studies that showed that a health worker who works directly with data generation, exploration and interpretation, feels about the usefulness or outcomes of a task, or confident in performing that task affected how the task to be performed (Teklegiorgis et al., 2016). While these five predictors exhibited higher levels of significance, inter-organizational political interference and evidence or facts recorded lesser significance levels to be predicting variables and consequently, debunks the assertion that health managers use a considerable amount of their working time in generating data for decision making (Bonenberger, Aikins, Akweongo, & Wyss, 2016).

The major predictors of the usage of DHIMS2 data in this study remained seeking feedback from concerned persons, emphasize data quality in monthly reports, Use of DHIMS2 data for setting targets and monitoring, provide regular feedback to their staff through regular reports based on evidence and reports on data accuracy regularly. Senior managers who tended to seek feedback from concerned persons as well as emphasize on data quality on occasional basis used sources of information for decision making in health, which include research, health systems and more importantly, periodic accounts on data quality. A similar finding has been reported in the literature (Aqil et al., 2009).

This study explored the chances of the DHIMS2 data being used for decision making on maternal and neonatal health. The findings revealed that some of the challenges faced by senior managers in their use of DHIMS2 data were the inability of senior managers to develop appropriate criteria for selecting interventions for a given problem (p>0.011), gather data to find the root cause of the problem (p>0.026), develop appropriate outcomes for a particular intervention (p>0.048), evaluate whether the targets or outcomes had been achieved (p>0.044), not empowered to make decisions (p>0.044), and did not use DHIMS2
data for community education and mobilization (p>0.021). The study argues that the inability of senior managers to develop appropriate criteria for selecting interventions for a given problem was a challenge associated with the use of DHIMS2 data for decision making regarding maternal and neonatal health in TMA in the Greater Accra Region (Mate, Bennett, Mphatswe, Barker, & Rollins, 2009).

Maternal and neonatal health, being one of the major instruments of discussion at all levels in the hospitals, has assumed its peak and led to various strategic contributions (Wagenaar, et al.,2016). Based on the bar chart shown in figure 4.1 and estimations of the regression model, the study concludes that senior managers’ inability to gather data to find the roots causes of maternal and neonatal health issues, develop appropriate criteria for selecting interventions for maternal and neonatal health constraints, develop appropriate outcome for a particular intervention, evaluate whether the targets or outcomes had been achieved and not empowered to make decisions on maternal and neonatal health were challenges associated with use of the DHIMS2 data for decision making and policy formulation on maternal and neonatal health.

6.4. Contribution to knowledge

This section presents the contribution of the study to knowledge in the areas of policy and practice and management of health care institutions as explained below.

6.4.1. Contribution to policy and practice

The DHIMS process encourages stakeholders at all levels to think strategically and holistically about the value of each role/component of the RHIS, and to adopt a sense of ownership in improving those elements within their span of control (Poppe, 2012). Additionally, the relevance of the study on the utilization of DHIMS2 for decision making as well as ensures that a better system produces more complete, accurate and timely data, better
data are trusted by decision-makers for evidence-based decisions, evidence-based decisions lead to more effective health programmes, and a stronger health programme improves the health status of a population (Ndabarora, Chipps, & Uys, 2013).

The ultimate objective of a routine health information system (RHIS) is to produce information for taking action in the health sector (Boadu, 2014). It seeks to ask questions such as: ‘Are we doing things right?’, ‘Are we doing the right things?’ The idea is that if things are being done correctly, the data should demonstrate that all activities were carried out as planned. Positive results should follow. The RHIS is an important mechanism to identify gaps in the management of the health system - and to resolve them to maintain and improve performance. With timely, complete and accurate information, managers can identify strengths and weaknesses of health system functions and services, and take appropriate action to maximize success (Ghana Health Service, 2015). For issues outside of their control, they can advocate for possible solutions and policy changes.

However, the systems designed to track health data often fall short as (Oduro-Mensah et al., 2013):

1. Data quality may be low, so nobody has faith in it.

2. Data quality may be sufficient, but there are no processes or channels in place for using the data, other than completing reports to send to district and national authorities.

3. Managers and staff might not appreciate the importance of their roles in the information process, and they have little incentive to give data processes the care and
Attitudes such as these, whether they reflect reality or misconception can undermine the effectiveness of any RHIS programme. If a routine health information system is to produce all the value it should, it must produce high-quality data - actionable insights framed on accurate facts. This information must be actively used to guide day-to-day operations, track performance, learn from past results, and improve accountability (Boadu, 2014).

The study makes a significant contribution to policy and practice in the health care delivery system since it clears misconceptions of the system and also facilitates the need for health facilities to collect relevant data for proper utilization and decision making. The facilities that are mandated to submit reports all belong to the government and this stresses the argument that the HIMS is a Government of Ghana/GHS system. There is the need for data to be collected from all private facilities and pharmacy/chemical/drug shops since these facilities are mostly patronised by clients in the communities. This will help in effectively designing and restructuring of the health care system for better health care delivery.

Although most facilities were not efficiently utilizing their data, some health facilities in one way or the other were using HIMS data to determine the number of services they were able to offer most importantly, the number of children who were receiving immunization as against those who should be receiving and this prompts facilities to do mop ups to attain the required coverage. This is the initial step and health facilities ought to be further encouraged to use the data.
6.4.2. Implication for Management of Health Care Institutions

The study found significant factors that influence senior managers’ commitment level to the use of DHIMS2 data for decision making in the area of maternal and child health in Ghana and applicable elsewhere. This is to argue that the research is of much significance to healthcare managers as well as scholars who want to upgrade and broaden their knowledge of the utilization of data by senior managers for decision making, which is accepted to be one of the most suitable methods for ensuring precision and accuracy with health policies. Again, the study findings are of immense importance to TMA in the Greater Accra Region under study as well as others outside when it comes to the DHIMS2 data compilation, coding, mobilization, and utilization. The findings will serve as a guide to the healthcare institutions, especially the Ministry of Health when they want to organize workshops, seminars and want to amend their policies for the various health catchment areas on how to improve upon their utilization of DHIMS2 data for decision making on maternal and neonatal health.

6.5. Recommendations

Based on the research analysis and findings, it is strongly believed that the under stated recommendations, if considered by the senior managers within the Tema Metropolitan Assembly of the Greater Accra Region and elsewhere, shall be helpful in diverse ways. Data handling, management and utilization, according to most researchers are the tools that lead to the enormous achievements of most organizational goals and objectives (Oduro-Mensah et al., 2013). As a result of this, the health ministry and senior managers in the various hospitals must consider these recommendations based on the results of the study:

1. Resources should be provided to senior managers to help facilitate data gathering processes to find the root causes of constraints associated with maternal and neonatal health.
2. Intensify community health education and mobilization on maternal and neonatal health by using the DHIMS2 data to identify zones or areas within the community that are prone to maternal and neonatal morbidity and mortality.

3. Senior manager’s empowerment to make decisions on maternal and neonatal health using the DHIMS2 data is of paramount interest.

4. With the adaptation/adoption of the DHIMS2 data, senior managers must take keen interest in establishing or developing appropriate criteria for selecting interventions for maternal and neonatal constraints.

5. To ensure data management and generation, managers within the Greater Accra Region must be required to provide regular feedback to their staff through regular reports based on evidence of the DHIMS2 data usage.

6. Policy makers, also in their quest to manage the DHIMS2 data in order to make formidable decisions and policies must request of senior managers to report on data accuracy regularly.

7. Another advisable method to manage and generate the DHIMS2 data is to use the DHIMS2 data for setting targets and monitoring on maternal and neonatal health in the region.

8. To improve commitment level strategies through personal likelihood to use the DHIMS2 data, there will be the need for supervisory directives to use the DHIMS2 data and comparison of data with strategic health objectives on maternal and neonatal health.

6.6. Limitations to the study

There were few challenges to the successful execution of this study. The difficulties
encountered during the compilation of adequate materials for the project included the reality that the research was limited to the challenges, socioeconomic/socio-demographic, behavioural and organizational characteristics of senior managers’ commitment to the utilization of DHIMS2 data for decision making on maternal and neonatal health. Technical factors were not dealt with in this study. The cost of printing out questionnaires, the transportation cost involved in administering them, the cost involved in the final print out and binding of this work all posed a great challenge to the researcher. Another limitation of the study was the use of only Tema Municipal Assembly and the Greater Accra Region out of the more than 200 municipal, metropolitan and district Assemblies in the country (Ghana Districts, 2018). Since the study was restricted to only senior managers, the sample size was limited to only 66 participants.

6.7. Future Research

This study has provided important insight on information regarding the commitment among senior managers towards the use of DHIMS2 data in maternal and neonatal health in the TMA in the Greater Accra Region. Additionally, the findings provide a foundation for further studies to be done in the area of data used for decision making to improve the quality of data and improve health outcomes. To rectify the limitation in this study, it is recommended that future studies should seek to include more regions and municipal, metropolitan and district Assemblies in the country as well as increase the sample size.
REFERENCES


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evidence from Uganda. BMC Health Services Research, 10(1), 188. https://doi.org/10.1186/1472-6963-10-188.


Appendix A: Study Questionnaire

Study Title: Commitment among senior managers towards the use of DHIMS 2 data for decision-making in maternal and neonatal health in Greater Accra Region

(To be filled by Senior Managers at Metro, Municipal, District and Hospital Levels)

Introduction: The objective of this study is to help contribute to interventions for improving information system and use of information. Please express your opinion honestly. Your responses will remain confidential and will not be shared with anyone, except for presented table forms. I appreciate your assistance and co-operation in completing this study. Thank you.

IDI. ID of Facility……………………

ID2. ID of Metro/Municipal/District……………………

DD1. Title of the person filling the questionnaire (circle answer)

1. Metropolitan Director of Health Service
2. Municipal Director of Health Service
3. Medical Director or Superintendent
4. Deputy Director Nursing Services or Matron (Hospital)
5. Deputy Director Nursing Services (Directorate)
6. District Health Management Team Member

DD2. Age (a) 30 – 40 (b) 41 – 50 (c) 51 - 60

DD3. Sex 1. Male 2. Female


DD5. Years of service in position 1. 1 – 3 years 2. 4 – 6 years 4. 7 – 10 years

DD6. Did you ever receive any training in DHIMS 2 related activities in the last 2 years? 0. No 1. Yes, □ Skip to D1 if no

DD7. Have you received a further training afterwards? 0. No 1. Yes

Yes


I would like to know your opinion about how strongly you agree or disagree to these questions on use of DHIMS2 data for decision making in maternal and neonatal health. There are no right or wrong answers, but only expression of your opinion on a scale. The scale is about assessing the intensity of your belief and ranges from strongly agree (1) to strongly disagree (5). You have to determine first whether you agree or disagree with the statement. Second, decide about the intensity of agreement or disagreement. If you agree with statement then use left side of the scale and determine how much agreement that is – strongly agree (1), agree (2),
and circle the appropriate answer. If you are not sure of the intensity of belief or think that you neither disagree nor agree then circle 3. If you disagree with the statement, then use right side of the scale and determine how much disagreement that is – disagree (4), or strongly disagree (5) and circle the appropriate answer. Please note that you might agree or disagree with all the statements and similarly you might not have the same intensity of agreement or disagreement and thus variations are expected in expressing your agreement or disagreement. We encourage you to express those variations in your beliefs. This information will remain confidential and would not be shared with anyone, except presented as an aggregated data report. Please be frank and choose your answer honestly. To what extent, do you agree with the following on a scale of 1-5?
<table>
<thead>
<tr>
<th>Commitment to data use are based on</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1. Personal liking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>D2. Superiors’ directives</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>D3. Evidence/facts</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>D4. Inter organizational political interference</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>D5. Comparing data with strategic health objectives</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>D6. Health needs</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>D7. Considering costs</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<thead>
<tr>
<th>Relationship between use of DHIMS 2 data and its generation are based on</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1. Seeking feedback from concerned persons</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>R2. Emphasize data quality in monthly reports</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>R3. Discuss conflicts openly to resolve them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>R4. Seek feedback from concerned community</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>R5. Use DHIMS 2 data for setting targets and monitoring</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>R6. Check data quality at the facility and higher level regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>R7. Provide regular feedback to their staff through regular report based on evidence</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>R8. Report on data accuracy regularly</td>
<td></td>
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</tr>
</tbody>
</table>

**Challenges in the Use of Data**

<table>
<thead>
<tr>
<th></th>
<th>Stronely Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1. Does not use DHMIS 2 data for day to day management of the facility and district</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P2. Does not display data for monitoring their set target</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P2. Cannot gather data to find the root cause(s) of the problem</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P3. Cannot develop appropriate criteria for selecting interventions for a given problem</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P4. Cannot develop appropriate outcomes for a particular intervention</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P5. Cannot evaluate whether the targets or outcomes have been achieved</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P6. Are not empowered to make decisions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>P7. Are not able to say no to superiors and</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
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<tr>
<td>colleagues for demands/decisions not supported by evidence</td>
<td></td>
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</tr>
<tr>
<td>P8. Are not made to account for poor performance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P9. Do not Use DHIMS 2 data for community education and mobilization</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P10. Admit mistakes for taking corrective actions</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td></td>
</tr>
</tbody>
</table>
## Use of Information: Directorate/Facility

### Assessment Form

<table>
<thead>
<tr>
<th>District/Facility</th>
<th>Name of Assessor</th>
<th>Respondent ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>DU1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does this directorate/facility compile DHIMS2 Data on maternal and neonatal health submitted by facilities or the hospital?</td>
<td>1. Yes</td>
<td>0. No</td>
</tr>
<tr>
<td>DU2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the district issue any report containing DHIMS2 information on maternal and neonatal health?</td>
<td>1. Yes</td>
<td>0. No</td>
</tr>
<tr>
<td>DU3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, please list reports that contain data/information generated through the DHIMS2. Please indicate the frequency of these reports and the number of times the reports actually were issued during the last 12 months. Please confirm the issuance of the report by counting them and putting the number in column 3.</td>
<td>1. Title of the report</td>
<td>2. No. of times this report is supposed to be issued per year</td>
</tr>
<tr>
<td>DU3a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU3b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU3c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU3d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the directorate/facility send a feedback report on maternal and neonatal health using DHIMS2 information to facilities or departments during the last twelve months?</td>
<td>1. Yes</td>
<td>0. No</td>
</tr>
</tbody>
</table>

### Display of Information

110
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DU5</strong></td>
<td>Does the district or facility office display the following data? Please indicate the types of data displayed and whether the data are updated for the last reporting period.</td>
<td></td>
</tr>
<tr>
<td><strong>DU5a</strong></td>
<td>Related to maternal health</td>
<td>1.Indicator</td>
</tr>
<tr>
<td></td>
<td>2.Type of display (Please tick)</td>
<td>3. Updated</td>
</tr>
<tr>
<td></td>
<td>Related to maternal health</td>
<td>Table</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graph/Chart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Map</td>
</tr>
<tr>
<td><strong>DU5b</strong></td>
<td>Related to neonatal health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.Yes</td>
<td>0.No</td>
</tr>
<tr>
<td><strong>DU5c</strong></td>
<td>Does the office have a map of the catchment area?</td>
<td></td>
</tr>
<tr>
<td><strong>DU6</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DU7</strong></td>
<td>Does the office display a summary of demographic information such as population by target group(s)?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Yes</td>
<td>0. No</td>
</tr>
</tbody>
</table>