KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI, GHANA
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SCHOOL OF PUBLIC HEALTH
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HEALTH WORKER DENSITY IN DEPRIVED AMANSIE CENTRAL DISTRICT: IMPLICATIONS FOR THE REALISATION OF UNIVERSAL HEALTH COVERAGE GOAL.

BY
DEBORA AKUA KONADU
(BSC IN NURSING (HONS))

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DECLARATION

I hereby declare that this submission is my own work for the award of Master of Public Health in Health Services Planning and Management and that, to the best of my knowledge, it contains no material previously published by another person, nor accepted for the award of another degree of the university, except where due acknowledgment has been made in the text.

Debora Akua Konadu ….…… ……..……..
(20530004) Signature Date
(Student Name & ID)

Certified by

Dr. Peter Adjei-Baffour ….…… ……..……..
(Supervisor) Signature Date

Certified by

Dr. Peter Adjei-Baffour ….…… ……..……..
(Head of Department) Signature Date

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TABLE OF CONTENTS

CONTENTS PAGE
DECLARATION..... ii
ACKNOWLEDGEMENTS iii
TABLE OF CONTENTS iv
LIST OF TABLES vii
LIST OF FIGURES viii
LIST OF ABBREVIATIONS AND ACRONYMS ix
DEDICATION..... x
ABSTRACT xi
INTRODUCTION..... 1
1.1 Background 1
1.2 Problem statement 4
1.3 Justification of the study 5
1.4 Research Questions 6
1.5 Objectives of the study 7
1.5.1 General objectives 7
1.5.2 Specific objectives 7

CHAPTER TWO 8
LITERATURE REVIEW 8
2.0 Introduction 8
2.1 Overview of health worker density 8
2.1.1 Global View 8
2.1.2 African Context on health worker density 12
2.1.3 Situation in Ghana and the Study Area 13
2.1.4. Theoretical and conceptual framework 15
2.1.5. Conceptual Framework 17
2.2 Staff strength/skill mix and density 18
2.3. Factors influencing health worker density 19
2.3.1. The challenges of health worker motivation 21
2.3.2 The challenges of Migration in health worker density 22
2.3.3 Professional development as an influencing factor 23
2.3.4 Management support as a factor to density 24

2.4 Health facility capacity .....
25 **CHAPTER THREE**
..... 27
METHODOLOGY
..... 27
3.0 Introduction 27
3.1 Study design 27
3.2. Profile of the Study area 28
3.3 Study population 29
3.3.1. Inclusion criteria 29
3.3.2. Exclusion criteria 29
3.4. Sampling Technique 30
3.4.1. Probability Proportional to Size 30
3.4.2. Simple random sampling 31
3.5 Sample size calculation 31
3.6. Data collection Technique and Tools 33
3.6.1. Data Collection 33
3.7. Pretesting 34
3.8. Study variables 34
3.8.1. Dependent variable 34
3.8.2 Independent variables 34
3.9. Data Handling 37
3.10. Data Analysis 37
3.11. Ethical Considerations..... 39
3.12. Assumptions of the Study 40
3.13. Limitations of the study..... 40
3.14. Reliability and Validity of study findings 41
CHAPTER FOUR 42
RESULTS 42
4.0 Introduction 42
4.1. Descriptive on Respondents Place of Work 42
4.2. Socio-Demographic Characteristics of Respondents 43
4.2 Staff skill mix and strength 47
4.2.1 The strength and skill mix of health workers 47
4.2.2 The distribution of health workers to doctor ratio for 2016 and 2017 49
4.3 Estimating Health Worker Density 51
4.4 Health facilities capacity in relation to access to care. 53
4.4.1 Functional Units 53

4.4.2. Physical conditions for quality health care 57
4.5: Factors affecting health worker density: Evidence among facility heads 59
CHAPTER FIVE ..... 67 DISCUSSION 67
5.0 Introduction 67
5.1. Respondents Place of Work 67
5.2. Socio-Demographic Characteristics of Respondents 67
5.2.1 Health Workers Characteristic 69
5.2 Staff strength and skill mix 71
5.2.2 The distribution of health workers to doctor ratio for 2016 and 2017 72
5.3 Estimating Health Worker Density 73
5.4 Health Facilities capacity 75
5.4 .1 Functional Units 75
5.4 2 Physical Conditions for quality health care..... 77
5.5 Factors affecting health worker density 78
CHAPTER SIX 84
CONCLUSION AND RECOMMENDATION 84
6.0 Introduction 84
6.1. Conclusion 84
6.1.1 Demographic Characteristics 84
6.1.2 Staff skill mix and strength 84
6.1.3 Estimating Health Worker Density 85
6.1.4 Health facilities capacity in relation to access to care. 85
6.1.5 Factors affecting health worker density 86
6.2. Recommendations 86
6.3. Suggestions for future work 88
REFERENCES 89
APPENDICES 94
APPENDIX A 94
APPENDIX B 100
APPENDIX C 105
APPENDIX D 107
APPENDIX E 108
APPENDIX F 111

LIST OF TABLES

Table 4.1: Respondents' place of work..... 43
Table 4.2: Demographic Characteristics of Respondents 44
Table 4.3: Socio-Demographic Characteristics of Respondents 46
Table 4.4: Number of Health Workers among Facility Levels 48
Table: 4.5: Ratio Estimation of Health Workforce 50
Table 4.6: Distribution of Health Workers Density 52
Table 4.7: Distribution of Functional Units and Facility level 54
Table 4.8: Distribution of Health Capacity and Facility levels 56
Table 4.9: Distribution of Health Physical Conditions and Facility levels 58
Table 4.10: Average score of factors influencing health worker density 60
Table 4.11: Descriptive statistics of the variables 61
Table 4.12: Negative Binomial Regression Results 63
Table 4.13: Intention to leave Facility of Work 64
Table 4.14: descriptive statistics of factors that influence people to leave 65
Table 4.15: Rank of factors that influence people to leave 66

LIST OF FIGURES

Figure 2.1 Conceptual framework 16
Figure 2.2: Conceptual Framework for the study 17
Figure 3.1. Categories of health workers in the district. 33
Figure 4.1: Health Staff Skills/Mix Ratio 50
Figure 4.2: Health Worker Density for 2016 and 2017 53

LIST OF ABBREVIATIONS AND ACRONYMS

ABCE	Access Bottlenecks, Cost and Equity
AMREF	African Medical and Research Foundation
CHAG	Christian Health Association of Ghana
CHC	Community Health care
CHPS	Community-based Health Planning and Services
DEA	Data Envelopment Analysis
GDP	Gross Domestic Product
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HASS	Health Administrative and Support Services Division
HRH	Human Resource for Health
HRMP	Human Resource Management Policy
IHME	Institute of Health Metric and Evaluation
JLI	Joint Learning and Initiative
LI	Legislative Instrument
MDG	Millennium Development Goal
MOH	Ministry Of Health
NGO	Non- Governmental Organisation
OCED	Organisation for Economic Co-Operation and Development
OPD	Out-Patient Department
PAHO	Pan American Health Organization
SAD	Staff- related Access Deficit Indicator
STATA	Statistics and Data
SDG	Sustainable Development Goal
SRN	Staff Registered Nurse
UHC	Universal Health Coverage
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

DEDICATION

This dissertation is dedicated to my Parents (Nana Kusi Yeboah II and Mrs. Elizabeth Amponsah Yeboah) who have been a strong support, whose love and constant encouragement have brought me this far.

ABSTRACT

Assessment of the number and availability of health workers has recently been a major discussion for the realization of Universal Health Coverage goals. An initiative by government towards the plan of action by WHO to achieve this objective was to post as many health workers as possible to the rural areas which are bedeviled with weak staff strength. As reported by WHO, globally only 38% of the nursing workforce remains in the rural areas, where almost half of the world's population lives. The general objective of the study was to determine the health worker density and its influences on achieving the universal health coverage in the Amansie Central District, Ghana. Quantitative data collection techniques with a cross-section study design were employed in this study. The study was conducted in the Amansie Central District with a total population of 103,074 and a sample size of 175. A multistage sampling approach involving probability proportionate to size and Simple random sampling was used. The data were analyzed as descriptive and inferential statistics using STATA 14. The significance level for all Statistical tests was set as 0.05. The study reported the current health staff to be 335 for the district in 2018. The distribution of doctor to health workforce ratio for 2017 showed 1:37; 1:8; and 1:4 for doctor to nurse, doctor to midwives and doctor to other cadres respectively. The coefficients of the negative binomial regression highlighted that job description, training plans, housing for personnel and conditions of service have a statistically significant effect on health worker density. The Kendall's W test showed the highest ranking factors which influence people to leave their facility were to further education followed by education for children and relocation of partner.

Findings from the study alarmed policymakers by exposing the health workforce gap at the district. Though some reports have commended Ghana for some important steps taken to improve the health worker density, however, two years review of the density in the district presented no significant improvement. Management support services such as job description, housing and training for personnel are recommended to improve health worker density.

CHAPTER ONE

INTRODUCTION

1.1 Background

The shortage of health workers in rural areas has been identified as an obstruction to health care delivery as well as the successful operation of the universal health goal. Introduction of the Universal Health Coverage (UHC) concept in Ghana has necessitated the plan of deploying more health workers to the rural areas for the achievement of the goal. The UHC concept of "health for all", means sending health to the "doorstep" of each individual. It was geared towards bridging the gap of inequality in the health system between urban and rural communities exacerbated by geographical imbalances. Quality health care delivery is skewed towards the wealthier and urban population in Africa (AMREF Report,2012). An initiative to achieve this objective was to post as many health workers as possible to the rural areas which are bedeviled with staff mix and skills challenge. In addition to the problem of low numbers of health workers; staff distribution, retaining and sustaining health professionals has also been a problem in rural areas. Having the required workers who are well motivated is the key strategy to achieve comprehensive health care delivery (Humphreys, Wells and Siegloff, 2009).

The health workforce should be seen as a performing body with adequate numbers and equitable distribution in regions, districts, and sub-districts. However, many countries around the world face difficulties in training, distributing and retaining health workers in sufficient numbers with the appropriate skills and productivity levels. The World Health Organization (WHO, 2006) as cited in (Grobler *et al.*, 2015), estimated that the "global workforce shortage is approximately 4.3 million workers, with some 57

countries facing critical shortage". The situation is most problematic and more alarming when viewing Ghana's entire population health needs. As reported by the WHO (2006) only 38% of the nursing work-force remains in rural areas, where almost half of the world's population live. The evidence about the effectiveness of rural retention interventions comes mostly from advanced economies like Australia, Canada or the USA (Mbemba *et al.*, 2013). Among studies of nurses or health workers retention in remote areas from developed countries, the rural background or the rural integration may constitute a powerful predictor of rural practice" (Mbemba *et al.*, 2013). According to WHO (2009), the shortage of health workers is estimated to be around 2.3 million physicians, nurses and midwives and over a total of about 4 million health workers generally.

The Joint Learning and Initiative (JLI) report on Human Resources of Health, stated that Sub-Saharan Countries must nearly triple their current numbers of workers by adding the equivalent of one million workers through retention, recruitment, and training if they are to come close to approaching the setbacks of the Millennium Development with the Sustainable Development Goals for Health (Mbemba, Gagnon and Hamelin-Brabant, 2016). The report further showed "*finding that countries with fewer than 2.5 doctors/nurses/midwives per 1,000 people failed to achieve an 80% coverage rate for deliveries by skilled birth attendants and immunization against measles*" (O'Brien and Gostin, 2011). Shortage of qualified workers had gotten to critical levels in resource-deprived areas. The current retention crisis is posing major effects on achieving health interventions.

The health sector in Ghana is seriously under-resourced and unable to adequately resource the health institutions. Funds that are sent to the district to manage the district health sectors are insufficient and late disbursement resulting in the district health-level

inefficiency. Again, the health sector is unable to institute strong working structures in health leading to the migration of health workers to developed countries. In view of the above discussion, Ministry of health in Ghana recently held a conference on "Effective Human Resource Management; A driving force in Organizational Change "to discuss ways of helping in the achievement of SDG's. The theme was categorized into three (3) basic processes (dimensions) in recruiting and retaining health workers towards achieving the UHC goal (HRMP 4th Conference Ghana, 2016).

1. Production- training the required staffs, challenges faced and overcome the challenges.
2. Productivity - having the competent staffs that are diligent with their work and at post.
3. Distribution- considered the distribution of the required staffs to both urban and rural areas in their required number (Liu *et al.*, 2017).

All the three dimensions pose a major challenge to the human resource department in the realization of the UHC target.

Performance is considered to be a combination of staff being available (retained and present) and staff being competent, productive and responsive (WHO, 2006). Policymakers and planners are realizing the immense contribution of addressing Human Resource crisis towards the achievement of the Sustainable Development Goals (SDG). With the increase in financing for health care through debt release and specific programs such as Global Alliance for Vaccines and Immunization and Global Fund (Global Fund to fight AIDS, Tuberculosis, and Malaria (Alliance for Health Report, 2017). It has, therefore, become necessary for policymakers to adopt

comprehensive measures or intervention, re-evaluate retention and sustain health workers in deprived areas towards meeting the SDG 2030.

1.2 Problem statement

As remarked by the World Health Organization (WHO), the Sustainable Development Goals (SDGs) value for health worker density composite threshold was 4.45 doctors, nurses and midwives per 1000 population. However, WHO reported that only 20 countries out of 192 countries yielded the SDG threshold of 2.56 doctors, nurses and midwives per 1000 population (WHO Report 2013). In terms of global record of health worker density, the report stated that out of 9.2 million doctors and 18.1 million nurses worldwide, United State which has 4% of the world population recorded 8% for doctors and 17% for nurses, with a ratio of 1: 4 respectively against countries such as China and India recording close to 1% (Crisp and Chen, 2014).

In Ghana, additional employment of about 400 doctors by MOH in 2014 reduced the doctor-person ratio of 1:10,170 persons in 2013 to 1:9043 persons in 2014. Nurse per population rate also showed an improvement from 2013, also meeting a target less than 1000 person per nurse. According to the same report, the standard workload for midwives is set by WHO as 175 deliveries per midwives per year and Ghana's midwives strength improved substantially in 2014. A detailed analysis showed large regional variation in midwife numbers and productivity. Volta and Ashanti Regions of Ghana showed average deliveries of 110 per year compared to Northern region's 190 deliveries per year. The same report further depicts that Ghana has more than enough midwives in the country (MOH Report, 2014). According to Ghana Health Report (2017), health worker to population density was reported for physicians, nurses, and midwives as 2.14 per 1000 population as against 1.07 per population for 2005. Despite,

Ghana's performance in health towards achieving UHC and earning good remarks from some African countries, (Campbell *et al.*, 2013), argued that Ghana still has not been able to attain the SDG threshold.

In the Amansie Central District annual report 2016, for a population of 103,074, the health worker density consists of a total of 229 nurses (SRN, enrolled nurses and community nurses) with 2.22 per 1000 population. Physicians (medical officers and physician assistants) recorded 0.97 per 10000 populations, midwives 0.33 per 1000 population, the district has only one pharmacist with a woefully 1: 103,074 per population. Laboratory technician of 3 makes a comparative ratio of 1: 34358 per population. Despite the MOH and Ghana Health Service report stating that Ashanti Region is one of the regions with considerably high health workforce, a district such as the Amansie Central in the said Ashanti Region recorded as low as 0.06 physicians per 1000 population. This signifies the inequality of health workers distribution which threatens to attain UHC goal. Also, in a report by the Health Administration and Support Services Division, Amansie Central was ranked as the 6th district with the least staff (HASS Report, 2017). Additionally, there are relatively few studies conducted on health worker density in Ghana and Africa whereas, in the said study area, there seems to be no study conducted as such.

1.3 Justification of the study

In the realization of the UHC, there is the need for equitable distribution of health workers to all areas, especially the deprived and under-resourced communities. Government essentially have the obligation of ensuring that the least possible set of services are provided on the basis of equity through distribution of health system resources by geographical location and across facility level. Once this is achieved, it

will enhance the achievement of the objectives of the concept of UHC; thus, ensuring that each individual has access to basic health care irrespective of social standing, race, culture, location, and financial status. It has become critical to build strong human resource information system to provide evidence-based data towards planning for the availability of required health workers in providing quality care that is timely and efficient. Planning for health requires knowledge on the numbers and characteristics of health workers to guide in decision making. This study intends to assess the health worker density and considerations for retaining staff in the Amansie Central District towards the attainment of the UHC goal. The district recorded a low workforce ratio for nurses, midwives, and physicians recording the lowest workforce ratio of 0.06 per population defeating the goal of UHC (HASS Report, 2017). The study intends to explore some health system factors, the capacity of health facilities and strength towards quality health delivery. The findings will help the district collaborate with the Ministry of Health and other stakeholders to adopt strategies to resolve the problem. The study will also serve as a future reference for other studies as well as the district since no work has been done in the district so far.

1.4 Research Questions

Fundamental questions guiding this study include the following:

1. What are the staff strength and skills mix in Amansie Central?
2. What is the health worker density?
3. How does health facility's capacity influence staff density and access to care?
4. What are the factors influencing health worker density in Amansie Central?

1.5 Objectives of the study

1.5.1 General objectives

The general objective of the study was to determine the health workers density and its influences on universal health coverage in the Amansie Central District.

1.5.2 Specific objectives

1. To assess health staff numbers and their skill mix in the Amansie Central District.
2. To estimate health worker density in the Amansie Central District.
3. To estimate health facilities capacity in relation to access to care in the Amansie Central District.
4. To evaluate health system factors that influences the health worker density in the Amansie Central District.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature on the topic of health worker density in deprived Amansie Central: implication for the realization of Universal Health Coverage Goal. It covers an overview of the topic in sub-sections under global view, African context, the situation in Ghana and the study area. It also expanded on key areas such as staff

strength and mix in health care delivery, health facility capacity, health worker density and the factors influencing density.

2.1 Overview of health worker density

2.1.1 Global View

Health workforce and density have been described in a report by Jim Campbell, as central in translating the vision of Universal Health Coverage (UHC)" (Global Health Report, 2015). The report further elaborated on the fact "UHC cannot be achieved unless health workers; the right skill, equipment, and support is within reach of every person". Emphasis on reaching the UHC goal can be realized by immense efforts both globally and nationally through good policies on health worker density. World Health Organization (WHO) explain that, "Universal health coverage (UHC) is defined as ensuring that all people have access to needed promotive, preventive, curative and rehabilitative health services, of sufficient quality to be effective, while also ensuring that people do not suffer financial hardship when paying for these services" (Link, Drislane and Akpalu, 2018). The concept of UHC emphasizes on the principle of ensuring access, equity and social justice, to health care in a way which is cost effective to the society at large (Campbell *et al.*, 2013).

Health workforce has been described by WHO (2012) as "all people engaged in actions whose primary intent is to enhance health". However, health worker density is explained as the workforce indicator. Health worker density is therefore defined as the "number of health workers per 10, 000 populations by cadre. Global estimates on health workforce/density state that, countries with less than 23 physicians, nurses and midwives per 10, 000 populations stand the chances of failing to achieve the UHC goal. Sustainable Development Goals (SDG) values for composite threshold identified as

4.45% doctors, nurses and midwives per 1, 000 population (WHO, 2013). According to WHO (2013), with analysis of Data Envelopment Analysis(DEA), only 20 countries out of the 192 countries yielded a DEA threshold of 2.56 doctors, nurses, and midwives per 1, 000 population.

Staff-related access deficit indicator (SAD) measures relative difference between a particular country's health workforce densities. They estimated that currently 34.5 health workers per 10, 000 population lack access to health care due to health workforce gaps. Also, more than 90 countries globally are faced with health workforce deficits. They stated that the health workforce is closely linked with poverty levels and the number of informal economies. Suggesting that, countries in low-income status can improve or attain the UHC by concentrating on policies to alleviate poverty and job creation tactic (Cometto and Witter, 2013).

The widely used benchmark for health worker density estimate of the minimum threshold for physicians, nurses, and midwives which was adopted by WHO in the "working together for health" has been criticized for its use in estimation in recent age. A paper by Giorgio and Sophie in (Cometto and Witter, 2013), gave an account based on four reasons for its inadequacy, as a threshold measure for health density as (a)" the evidence underpinning the threshold value was based on data on immunization coverage and skilled birth attendance". (b) It only allows the identification of inadequacies in the numbers of health workers". It does not consider issues relating to access, quality, and performance. (c) Some low- income countries would have to allocate 50% of its GDP to health to be able to attain the required threshold which may be burdensome to these countries considering that countries like Ghana spend about 85% of its income in paying health workers. (d) The benchmarks only relate to physicians, nurses, and midwives. Other paramedical staffs who contribute immensely

to health care delivery were not captured. Again Brok K Baker in (Cometto and Witter, 2013), also gave an account of the over-due reference of the WHO benchmark. He stressed on the minute fraction of health care needs as the basis for the estimation undermining responds to other pandemics such as malaria, HIV and tuberculosis and growing prevalence of non-communicable disease.

A report by PAHO/ WHO (2013) stated that about 70% of the countries in America have more than enough doctors, nurses, and midwives. The biggest difficulty is in the distribution, training, and migration. The report again stated a global shortage of 7.2 million health workers projected to reach 12.9 million by 2030.

Estimates from Portela et al., gave records of the global shortage of 12.9 million health workers with close to 83 countries encountering difficulties from this. Europe is estimated to encounter health worker shortages of 1 million in 2020, which is projected to double due to aging and its complication. In the same report, average densities of health worker per 10, 000 population was shown as; global categories of doctors (12.3), nurses/ midwives (17.6) and pharmacists(3.6) (Portela *et al.*, 2017).

Another study in India showed a total health worker density of 20.9 health workers per 10, 000 population (health workers were estimated from various cadre including allopathic doctors, nurses, midwives, traditional medicine, health associates, dentist). The estimates were adjusted to the qualification which showed a decline of 9.1 per 10, 000 population of the total population. Particular interest to this study was the density of nurses and midwives which declined from 7.6 to 3.1 per 10, 000 populations after the adjustment, throwing emphasis on the high levels of unqualified providers in India health workforce. The study affirmed that allopathic doctors, nurses and midwives densities of a total of 6.4 per 10000 population falling below the WHO benchmark of

22.8 workers per 10, 000 population in achieving 80% of deliveries being attended to by qualified professions (Rao, Shahrawat and Bhatnagar, 2016).

In Vietnam, the results showed a remarkable increase in staff strength from 2006 to 2013; though the results showed notable differences between the various categories of nurses, doctors, midwives, and pharmacist. While nursing numbers rose from 110, 000 in 2006 to 15, 500 in 2013, other categories showed a gradual increase in their trends over the period. The regression model was used in analyzing the relationship between the two variables. With a p-value of ($p<0.05$), the study made statistical inferences that "Having one more doctor per 10, 000 people on average will add up to 4.12 months to life expectancy. The impact was much bigger for midwives and pharmacist at 9% and 19% respectively.

2.1.2 African Context on health worker density

Africa has seen many reforms in health over the past decades resulting from crisis, democratization, and default information system. Considering the labor market for health workers in African; focus is immensely on demand, supply and distribution across Africa (*World Bank Report,2013*)**.**

Considerably, the focus has been given to health worker shortage in African since the report by World Health Organization in 2006 "Working together for health" addressing the health workforce crisis and in countries with poor health indicators. Jimba et al., (2010) described the transition as a pathway in addressing the challenges of the health workforce; categorizing the processes as disease-specific approach, semi-horizontal approach, and horizontal approach. Universal Health Coverage (UHC) seeks to address the shortage of health workers in relation to disease burden in various Countries;

barriers are recognized, credible gap, factors and possible interventions towards accomplishing the UHC goal (Jimba, Cometto and Yamamoto, 2010)

In a study by Liu et al., the estimated worldwide demand for health workers projected to 2030 and over an increase of 80 million. They predicted a shortage of 15 million workers to occur in East Asia, Pacific, South Asia, Latin America, the Caribbean, Europe, and Central Asia. However, the study claimed that contrast to the Sub- Saharan Africa Region turn to show a surplus of 0.8 million health workers indicating unemployment. It further elaborated that base on the need-based model, the largest health worker shortages will result in low and lower middle- income countries peculiarly in Sub- Sharan Africa and South Asia regions. These countries health worker densities fall below WHO benchmark (Liu *et al.*, 2017).

Another report ranked Mozambique as one of the African Countries with the lowest health worker density with 0.3 doctors and 3.4 nurses per 10, 000 people as estimated in the world health statistics report. It has a population approximated as 24 million; one of the Provinces in Mozambique (Tete) was estimated to have 2,000 health workers with a breakdown of 63 qualified doctors and 300 nurses per a population of 2,000,000 people mainly living in rural areas. A doctor is estimated to be responsible for 30,000 people, a nurse to 8,000 people, causing barrier in assessing health care (World Bank report, 2013).

Somalia has been identified as one of the African Countries with poor health indicators, with an average life expectancy among the lowest in the world, contraceptive prevalence rate at 15%, maternal mortality (1.200 per 100,000) and under-five mortality (180 per 100,000 live births) (Report, 2013)(World Statistic,

2012). Somalia has 0.4 doctors per 10,000 people and 1.1 nurses and midwives per 10,000 people. This has resulted in the Country experiencing one of the lowest health statuses in the world. Reports have identified under-five mortality rate as 91 deaths per 1000 live births and infant mortality of 72 deaths per 1000 live births.

2.1.3 Situation in Ghana and the Study Area

Ghana has been recognized by its's immense achievement towards the UHC since 1990. Ghana is one of the Sub-Saharan African countries making a considerable progress in many health outcome indicators (Alhassan *et al*., 2013). It has been cited for its efforts made towards reducing maternal mortality by 44% since 1990 (AgyeiBaffour *et al.*, 2013)**.** The percentage of deliveries attended by skilled health staff also increased from 44.2% in 2008 to 53.3% in 2011 (Alhassan *et al*., 2013).

A study by Campbell *et al.* (2013), explored lessons from four countries namely Brazil, Mexico, Thailand, and Ghana. According to the study, these Countries were purposely selected based on their achievement towards sustained improvement towards UHC since 1990. The study related the successes to policies targeted towards health workforce to expand population coverage and other health incentive packages or benefits designed in achieving the UHC. The study focused on four dimensions; availability, accessibility, acceptability, utilization, and quality. Linking these dimension to production, financial dimension, sociocultural factors and competencies respectively. The study further shifted its focus to health workers density per 1,000 populations. Human Resource for health strategic plan (2007-2011) in Ghana adopted the dimensions of UHC in improving its strategies in recruitment and retention. This yielded an increase in the supply of professional health workers, 185% more midwives,

260% more nurses and 130% more physicians constituting an approximately 1400 additional professional health workers trained and employed (Campbell *et al.*, 2013).

However,(Agyei-baffour *et al.*, 2013) described interventions by Ghana Ministry of health to curb urban-rural disparities, maldistribution of health workforce as well as the progress of the UHC goal as largely unsuccessful and poorly evaluated in recent times. Another study described the achievements as insufficient in the realization of the 2015 targets for health-related MDGs. The study related some of the factors to be due to understaffing in health facilities, inequitable distribution of health sector human resource, demotivated staff and inadequate healthcare infrastructure (Alhassan *et al*., 2013).

Report from Ghana Health Service has a total workforce of 68, 132 resulting in 66% of the total health workforce denoting a 6.6 increase over 2015; CHAG with 16% and 11% for Teaching hospitals. By regional distribution, the total human resource in all ten regions recorded 102, 019 (excluding Health trainees). Ashanti and greater regions recorded the highest of health workforce proportions of 18% and 19% respectively taking up almost 40% of the total workforce. Eastern region comprised of 9.5% while the upper West and East regions were with the least in numbers as low as 2.000 and 4000 respective. One of the measures that were outlined for implementation towards UHC goal is an equitable distribution of Human Resources for Health (HRH) (Ghana Health Service Report, 2017).

Health worker density seems to be fairly good in Ghana as compared to other countries in Africa. Health distribution, however, favors urban areas with some urban cites recording considerable numbers compare with rural areas. Health worker density is

highest in regions such as greater Accra, Ashanti, and Volta as against the Northern region (Ghana Health Service Report, 2016).

A paper by Harvard "Medical system in Ghana" described the trend of Ghana's medical education in relation to distribution and inequality in urban-rural areas. It stated that to begin with, the medical universities in Ghana are based in urban cities of Accra, Kumasi and Tamale, though these universities produce an estimated figure of 300 or more doctors a year, the number of physicians at keeping at a constant of 1400 for many years due to emigration. It further stated that Ghana has great difficulty extending modern medical care to smaller towns and rural areas (Link, Drislane and Akpalu, 2018).

2.1.4. Theoretical and conceptual framework

Health workers face many challenges ranging from socio-demographical challenges to the changing trends of epidemiological events in population- based threats.

Coupled with these, other factors come into play such as financial policies; technology advancement and the perception of patients which tend to shift the health workforce demands. Many more factors come into play to cause a pull and push effects in the health system resulting in migration from rural to urban and again from poorest countries to wealthier countries. The impact of these on workforces has led to critic shortages in some poor countries and rural areas; inappropriate skill mix (availability, skills and distribution discrepancies), health capacity issues and gaps in the health workforces hinder the successes of the health systems, especially, in Ghana. Again, many health workers are confronted with disheartening work environment, low wages, unsupportive management, poor career development and poor of no motivational structures WHO (2006). These theoretical perspective cans seen as shown in the conceptual framework (figure 2.1) constructed by WHO (2013).

Figure 2.1 Conceptual framework

Source (WHO, 2006a)

2.1.5. Conceptual Framework

The conceptual framework in figure 2.2 gives a brief overview of elements towards the realization of the universal health coverage which is captured in the specific objectives of the study. In this framework, the research looks into enhancing access to the quality of care through health worker strength or workforce. The study considers health workforce impact on quality of care as a means to achieve the UHC goal. Another element is increasing coverage in health care through recruitment and retention packages.

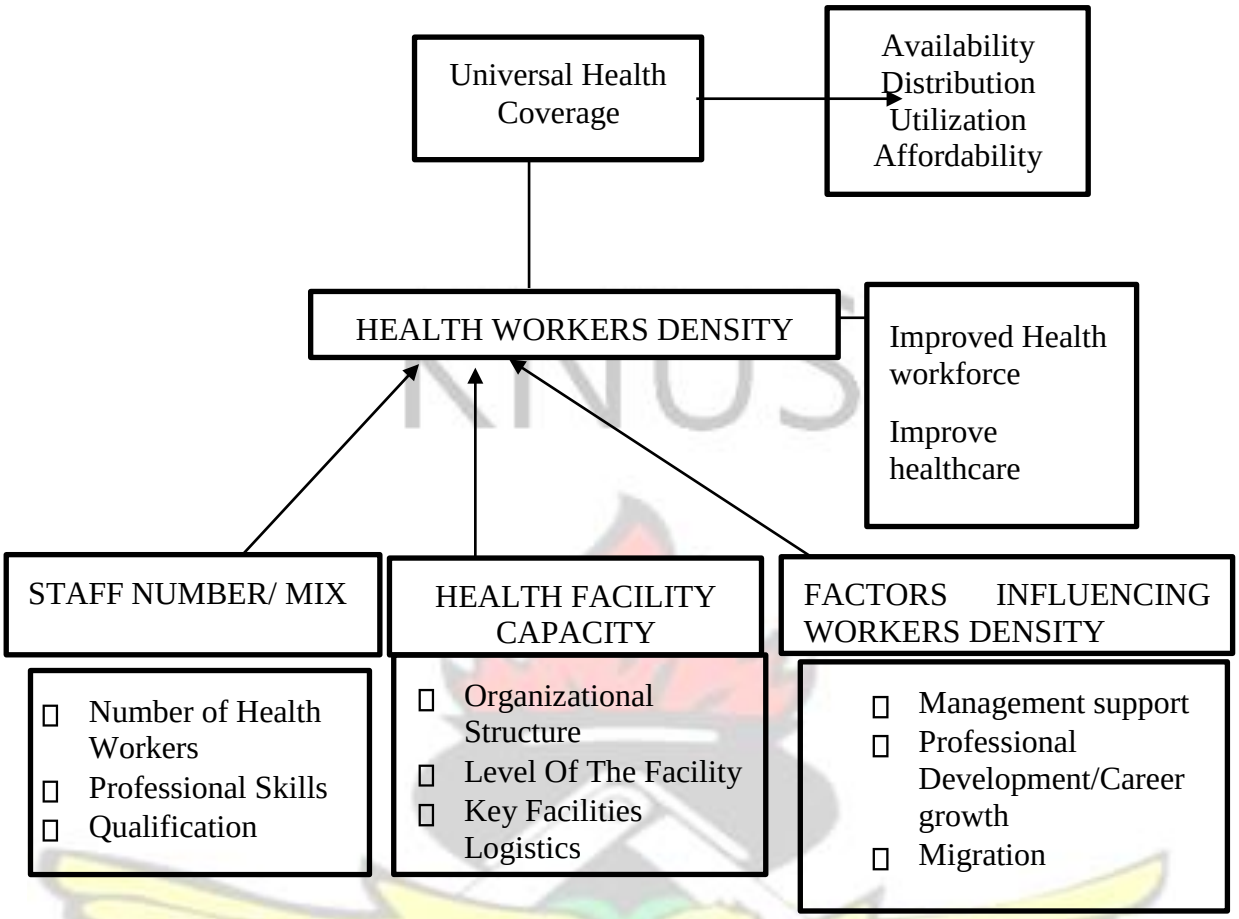

Figure 2.2: Conceptual Framework for the study

Source: Author's own construct, 2018

The focus of the study was to assess health inequality in the health system by evaluating the density of health workers against WHO threshold and again to explore health workers intention to leave these deprived areas. The last element explored well-run health system; where the study focused on health system or organizational factors, the capacity of the health facility and factors influencing density toward the realization of the UHC goal: the way forward for Ghana (Okech and Lelegwe, 2016).

2.2 Staff strength/skill mix and density

Staff mix and Skill mix concept has been studied by diverse authors for the scope of health system related issues towards management and policy interventions. Staff skill Mix of health workforce is being defined in the context of the study as a combination of skills available at a specific time or range of activities that constitute every one's role (Baral *et al.*, 2013). The concept of health care delivery is been used to address the challenges of workforce challenges. WHO in its report in 2016, gave account of the pattern of availability globally by stating that 83 countries fall below the threshold of 22.8 skilled health professionals, 100 countries below the threshold of 34.5 skilled health professionals, 118 countries fall below the threshold of 59.4 skilled health professionals and 68 countries also were above the threshold of 59.4 skilled health professionals per 10000 population for all estimates (WHO, 2016). "*In particular, there is an extreme imbalance in the distribution of the estimated 12 million working nurses worldwide: the nurse-to-population ratio is 10 times higher in Europe than in Africa or Southeast Asia, and 10 times higher in North America than in South America"*(O'Brien and Gostin, 2011).

In a study conducted in Nepal (Baral *et al.*, 2013), Some of the findings revealed disparities in Urban-rural workforce and distribution. They claimed staff mix was sufficient in regions as compared to rural areas due to inequitable distribution of health workers which resulted in a shortage in rural areas. In their analysis of the study, they reported staff mix out of 14 districts, 6 representing 43% had the required skill mix of health workers during the period of the survey. The study reiterated the fact that Nepal had a shortage of human resource for health and further stated that the situation was exacerbated by inequities in distribution among other factors.

The study of Venessa Autune and Paulo Moreira has undertaken as a systematic review of skill mix from different databases, describing works from 1998- 2011. The study concluded by stating that despite the wide interest in the subject; there still exist evidence on its implication, challenges, outcomes and quality impact (Antunes and Moreira, 2013).

2.3. Factors influencing health worker density

Factors accounting for the shortage of health workers vary from country to country and within countries; vary from region to region. However some factors have been identified by the global Human resource for health as; insufficient supplies and training of health workers, inadequate distribution, inefficient utilization and crisis (International report, 2014).

Factors identified in a systematic review cited professional factors, working conditions in rural areas, high workload and availability of equipment among important factors in attracting health professionals in rural areas. Other identified professional factors are resources availability, facility management, and hospital infrastructure. (Mbemba, Gagnon and Hamelin-Brabant, 2016).

Another study explored the factors and noted physical infrastructure, training opportunity, support by seniors, good schooling for their wards and promotion as important factors to retaining health professionals in rural areas thereby affecting health worker density(Report and Conducted, 2012). Addition to health workforce shortages, several health systems have been identified with inadequate and inequitable resources use as well as allocation; demotivated personnel, inappropriate and costly skill mixes of health workers (Code *et al.*, 2014).

A study conducted in Cameroon showed finding for health worker (nurses and doctors). The study described health infrastructure as an important determinant to job choices and an attributed value by health workers. Participants expressed that lack of equipment, suppliers, and drugs influence one's choice of work (Robyn *et al.*, 2015). Factors that were identified to have led to the critical shortage of health staffs in Somalia were migration (travelling overseas for green pastures), inadequately equipped facilities, unmotivated staffs and means of transportation (International report, 2013). A study by Scott el. al, focused on health system factors while exploring some social factors thought to influence health worker density. Health system factors presented in this study were broadly categorized under management support (Job description and task shifting policy), conditions of service and professional development (condition of service, job promotion, and training) and motivation factors (accommodation, transport availability, social services such as banks, electricity portable water, allowances, study leave opportunities, availability of schools for children) (Scott and Govender, 2017).

2.3.1. The challenges of health worker motivation

Motivation has been defined in diverse ways. Motivation has been defined by Merriam-Webster as the act or process of giving someone a reason for doing something. Aladwan et al. (2013) defined it as "the set of force that leads people to behave in particular ways" (Songstad, 2012). It has also been defined as "an individual degree of willingness to exert and maintain an effort towards organizational goals (Sato *et al.*, 2017). The motivation of health workers has received considerable importance in its immense role in providing quality health care delivery. Though the emphasis in providing quality health services has been on the numbers, skills, and logistics, it is quite interesting to know that motivation plays a vital role on the person giving the care (Songstad, 2012). The study further cited a work by Dieleman et al. which pointed the fact that "the main

motivators of health workers were related to responsivity, training, and recognition, next to salary" in (Songstad, 2012).

Most literature on motivation, however, has described it under intrinsic and extrinsic factors. Intrinsic motivation has been described under job satisfaction, commitment, job security, and workload. Extrinsic is also described as salary, availability of resources, managerial support and policy environment (Sato *et al.*, 2017). (Buabeng and Partial, 2016) cited a work by Afful Broni (2012), which pointed out that the problem of job performance could be associated with a lack of motivation. The study, therefore, identified motivational factors such as personal satisfaction, and continuous training and development as intrinsic factors which may influence performance as well as responsive service, adequate equipment, and drugs, adequate knowledge, and skills.

A cross-sectional cluster made a comparison of identified factors of motivation and retention as work environment, remuneration; retention factors as an intention to leave (attrition) and work preference. The researcher stated that salary could not be considered as an important factor to motivation (Ojakaa, Olango, and Jarvis, 2014).

2.3.2 The challenges of Migration in health worker density

Migration described as the movement of health workers from rural to urban, poorer to less poor areas, public to private sector or to program funded by donor organizations and non- governmental organizations (NGO). Health worker migration from resourcepoor countries to developed countries as "brain drain" posing challenges to attaining global health equity (Mackey and Liang, 2013). The patterns of migrations often result from a combination of "push" and "pull" factors. The push factors have been described as economic, heavy workload, lack of employment rights, lack of

professional satisfaction, security etc. Pull factors also have been described as promises of workplace improvement, social environment, family factors etc. (Johansson, 2014).

Worsening the crisis of health worker shortages, inequitable and distribution of health worker has been the immense expansion of migration (Code *et al.*, 2014). The report again made reference to the fact that migration and other factors in low resourced countries with low health indicators is a major influencing factor in health worker density (Code *et al.*, 2014). Johansson (2014), showed results indicating that high salary, career possibilities, and field of interest were among the important factors in the choice of a place of work.

(Walton-roberts *et al.*, 2017) in "causes and consequences of migration" made an indication that majority of health workers had no intention of migrating in the first two years of work. The study identified three work-related factors and the most pressing cause as income, living conditions as well as opportunities for specialist training and professional development.

2.3.3 Professional development as an influencing factor

Professional development is essential in the career build-up of every health worker. Highlighted in a report by OCED on "the need for new skills and competence among health workers as part of the UHC target, an agenda was raised for (2017-2021) towards health worker development in meeting their full potentials while applying skills to meet evolving healthcare needs (OCED Report, 2018). The report again made mention of the high levels of skills mismatch among health workers and emphasized its effect on the health care delivery.

Report by (Policy Brief, 2016), made emphasis on the fact that an increased demand on health workers in the areas of the current trend in care delivery, technology, aging of the population may increase the risk of burnout while trying to respond to the needs.

In a study by (Beck, 2012), health workers identified important professional development factors as promotional avenue and training opportunities. Training opportunity, as well as the frequency by an organization, was quoted as a significant attribute to the workforce as well as its competence.

Among significant factor described in the study of (Ayalew and Ababa, 2015) to influence turnover intentions was educational qualification and opportunities for professional development. However, in a study conducted in Ethiopia by Michael et al, limited opportunity for professional development and career advancement was among factors noted to influence health worker density (Michael *et al.*, 2015).

Also,(Chimwaza *et al.*, 2014), stated in findings of a qualitative study that intention to leave was related to poor management issues and cited lack of recognition and promotion as some factors.

2.3.4 Management support as a factor to density

Management support has been described in (Beck, 2012) as " the extent to which organization supports employee professional development and continuing education". Support from senior colleagues has been described as an important factor in retaining health workers in rural areas thereby influencing worker density.

Other studies have attempted to explore the effects of the workplace environment and its effects on attrition, performance, and density. This was described in (Mj, Eu and Nm, 2017), as reasons why employee may leave their facility. Some attributes identified

were job aids, goal-setting, superior or managers support and performance feedback were noted among others as important factors to health worker performance as well as density.

In another study by (Michael *et al.*, 2015), factors such weak performance, management and leadership problems, lack of recognition for good work among others were cited to factors that may result in high attrition. Though factors reported on condition of service, monitoring, and evaluation, Job promotion and training was found not to have any statistical significance with the facility level and may not have much bearing of intention to leave ones facility; these have been recognized as important motivational factors for health workers in other studies (Aditya Singh, 2016). Report conducted by (Ramani *et al.*, 2013) in a qualitative study to solicit response from some category of health worker highlighted the importance of offering support to health workers by management heads.

2.4 Health facility capacity

The performance of a country's health system ultimately shapes the health outcomes experienced by its population. It influences the ease or difficulty with which individuals can seek care and how the facilities can address their health needs. Health facility-based services require a spectrum of a combination of resources, human, physical and/or infrastructure. Health facility efficiency is critical information for policy-makers, especially, as rural areas are disadvantageous in terms of health facility coverage, functions and personnel requirement within national constraint budgets.

For Ghana and other African countries to fully achieve the Universal Health Coverage policy as well the attaining the Sustainable Global Goals, often referred to as Sustainable development Goals with respect to health service provision, it is a priority

to systematically consider the range of factors that contribute or hinder the central health goals. In Africa, most health facilities are generally reported to be providing a given service but then lacked the full capacity to adequately deliver their services such as lacking functional and productive equipment, stock out of medicine, insufficient bed facilities, and lack of logistics among others (Institute for Health Metric and Evaluation, 2014).

In a study conducted by Institute for Health Metric and Evaluation (IHME) across health facilities in Access Bottlenecks, Cost and Equity (ABCE) countries (Ghana, Zambia, Kenya, and Uganda) in Sub-Saharan Africa, Zambia had a high average efficiency score of 42% followed by Kenya (41%), Uganda (31%) and Ghana (27%) (IHME, 2014). Surprisingly, Kenya had the highest average facility costs per inpatient bed-day among the other three (3) countries.

In a study conducted by the Institute for Health Metric and Evaluation (IHME) in Kenya, minor differences were found in both equipment and pharmaceutical stocks across facilities located in urban and rural areas. Similarly, rural district and subdistrict hospitals generally lagged behind their urban counterparts in having in stock the recommended equipment, pharmaceuticals, and staffing-target

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter focuses on describing the data and methods used in this study. It provides a brief discussion about the study area and several conceptual details as well as the various issues associated with quantitative research methods. In this study, analysis was also made on health workers density, exploring the relationship between the strength of health workers, access and quality of health care delivery. The study also explored factors influencing health care density and its effect on access and health care delivery towards achieving the Universal Health Coverage (UHC) goal. Having described the data and variables in detail, the chapter offers a detailed account of the rationale for and the different methods of analysis used to accomplish the objectives of the study.

3.1 Study design

This study was analytical by type and cross-sectional in design. In cross sectional design information is collected from a given sample of the population at one point in time (Geinsburg, 2011). This design was appropriate for this study because it was easy

to use considering the study population and comparatively cheaper looking at the short duration to complete the study.

Quantitative method was used for analyzing the data; this aided the researcher to arrive at a valid, reliable and meaningful conclusion. The study reviewed Ghana policy documents from Ministry of Ghana and other published materials within the timeframe of 2009 to date.

3.2. Profile of the Study area

Amansie Central is located in the Southern part of Ashanti Region; the district was established by Legislative Instrument (LI) 1774, 2004. It has about 206 settlements with Jacobu, the administrative Capital, approximately 40km from Kumasi. It is located in the vegetation with a mixture of low and high land stretching to cover a total area of about 710 sq km which represents about 32% of the total land area of the Ashanti Region. It shares common boundaries with Bekwai Municipal to the North East, Amansie West to the West, Obuasi Municipal to the South East, Adansi North to the East, Adansi South to the South and Upper Denkyira in the Central Region to the South. The road from Kumasi, the regional capital, to Jacobu, the district capital is a second class road. Unfortunately, around and in most parts of the district, the roads are not motorable. According to the 2010 population census, 89% of the population resides in rural localities with an estimated 2016 population of 103,074 (Amansie Central population indices, 2016). There is one town council (Jacobu) and six (6) area councils in the district namely Fiankoma, Hia, Afoako, Numerso, Fena, and Tweapease.

Generally, the main economic activity of the populace is farming. Small-Scale Mining "galamsey" which used to be a major activity engaged in the district has come to the forefront. The health delivery system in the district is carried out by staffs working in

fourteen (14) public and private health institutions and 28 CHPS zone. The institutions are eleven (11) governments, two (2) CHAG or mission and one (1) private. The district has one hospital (CHAG), eight (8) health centers, one (1) clinic, three (3) CHPS and one Maternity home (private). Jacobu has a catchment population of 37247, Fiankoma (15102), Fena-Hia sub-district (24609), Tweapease subdistrict (11709). There are two (2) RCH units where public health staffs undertake outreach services. There is a total strength of five hundred and seventeen (517) out of which two hundred and sixty-three (263) are mission hospital staffs forming about 50% of the total workforce. In all, there are 35 midwives, 96 enrolled nurses, 81 community nurses, 50 general nurses (SRN), 7 doctors, one pharmacist, 3 physician assistants and 2 public health nurses (Amansie Central District annual health report, 2016).

3.3 Study population

The study population comprised facility heads of all health facilities in the district. It again included health workers consisting of nurses (all categories of nurses), midwives, doctors, pharmacist, laboratory technicians who have worked in the district for over six months. Staff that just started work to six months was excluded from the study, the reason being that six months is the probation period and therefore staff may choose to exit or appointment may be terminated. Again the study excluded nonmechanized staffs, ward assistants, orderlies, biostatistician, drivers and laborers.

3.3.1. Inclusion criteria

- Health workers comprised of nurses (general nurse, community nurses and enrolled nurses), midwives, physicians (medical doctors and physician assistants), pharmacist and biomedical scientist as well as laboratory technicians who have worked in the district over six (6) months.

- Management members of all health facilities.

3.3.2. Exclusion criteria

- Staff who just started work to six months (health workers on probation)
- Non- mechanized staff/casual workers, wards assistants, orderlies, biostatisticians, drivers and laborers

3.4. Sampling Technique

Sampling technique employed in this study was the multistage sampling. Firstly; probability proportional to size was used where health workers were classified into their various cadres (categories) and proportions of each were drawn from the total population of health workers. In the second stage, the researcher used the simple random sampling to draw a representative sample for the total population.

3.4.1. Probability Proportional to Size

The total number of health workers was primarily categorized into the following cadres. To obtain the total population of health workers that were sampled from the various categories, the proportion of each of the categories was multiplied by the total sample size. This enabled the research sample representative sample size for each of the categories. Their proportion estimated for selection can be expressed mathematically as:

$$Health\ Category = \frac{Proprotion\ of\ category}{Total\ number\ of\ health\ population} \times sample\ size \qquad (3.1)$$

Substituting the above formula by the respective health category group resulted:

$$Nurses = \frac{229}{286} \times 175 = 140$$

$$Midwives = \frac{35}{286} \times 175 = 21$$

$$Physicians = \frac{10}{286} \times 175 = 6$$

$$Laboratory\ Workers = \frac{6}{286} \times 175 = 4$$

$$Pharmacits = \frac{6}{286} \times 175 = 4$$

The total sum up the required sample size of 175 that was used for the study.

3.4.2. Simple random sampling

The researcher employed the use of random number generator software from a sample frame generated from the district's data. A complete list of names of all health workers identified in the study sample was obtained and each name assigned to a unique number. These numbers were inputted into random number generator software, from which random output was collated. The corresponding eligible respondent was contacted for consent and subsequent data collection.

3.5 Sample size calculation

For the purpose of this study, the Yamane mathematical formula for determining a more inferential and representative sample size (Yamane, 1967:886). The simplified formula is given by the formula;

$$n = \frac{N}{1 + N\ (\alpha)^2}$$

Where n = the sample size; N = population; and e = level of precision (5% margin of error). When this formula is applied to the above sample frame, the study arrived at 167 respondents as the sample size. This can be shown below:

$$n = \frac{286}{1 + 286\ (0.05)^2}$$

$$n = \frac{286}{1.715} \quad = \quad 166.76$$

However, 5% of the derived sample size was calculated to reduce the problem associated with the selection of non-respondents. This value (5% of the sample size) is added to the old sample size to conclude on a more acceptable new sample size. Like any social survey research, many studies do not attain the 100% response rate for the determined sample size. It is necessary to account for low response rate and uncooperative subjects although it also accompanied with cost to the survey. The sample size was therefore increased by 5% to correct all uncertainties and reduce cost since it was a true representation of the population. Therefore, this implies that the determined new sample size for this study was 175. This can be seen from the formula below;

$$n = (0.05 \times 167) + 167$$

$$n = 8 + 167 = 175$$

In the quantitative design, data was being collected from five (5) sub-districts which form part of the District including Jacobu, Fena-Hia, Tweapease, Numerso, Fiankoma. Data was collected based on identified specific objectives; questionnaire was designed on staff strength and mix, health facility capacity and factors that influence health worker density. These questions were put into sections. A structured questionnaire was administered to respondents. The questionnaires were self administered to reduce error. The data was collected and analyzed using Stata 14.0.

3.6. Data collection Technique and Tools

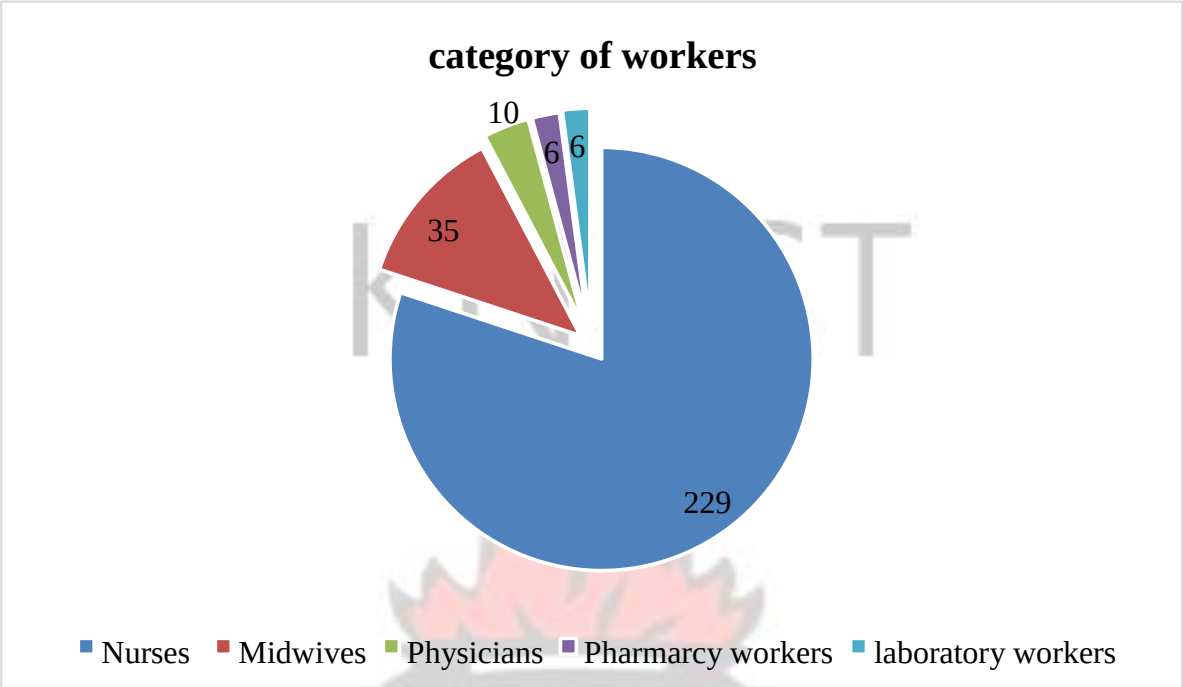

Figure 3.1. Categories of health workers in the district.

3.6.1. Data Collection

Data were conducted by the use of a self-administered questionnaire. The questionnaire was designed; some questions were adopted from the article "Assessing Health Needs and capacity of Health facilities" and a WHO questions on "Tools for Assessing the Operationality of District Health Systems". The questions were modified to measure staff strength/skill mix, the capacity of health facilities and factors influencing health worker density in the Amansie Central District. Information filled out in the questionnaire include socio-demographic data, information relating to organizational benefits, personal development, the capacity of the institution, availability of physical conditions and equipment, motivation, management support and the possibility of leaving the current facility. Procedure for collecting data was achieved by following all ethical protocols; the questionnaire was distributed to participants from facility to facility while observing the institution. Participants were taken through the

questions to solicit the right response and completed questionnaires were taken and kept secured. Participants and facility heads were thanked for their cooperation.

3.7. Pretesting

Pretesting of the questionnaire was done at Bekwai Municipality which shares boundaries with Amansie Central using 5% of the total calculated sample size. The district shares similar traits with Amansie in terms of socio-demographic characteristics. A total of 9 questionnaires were distributed at Bekwai Government Hospital which were reviewed and analyzed. This enabled researcher identifies problem areas, modifications were done and necessary correction made.

3.8. Study variables

Study variables are identified as dependent and independent variables.

3.8.1. Dependent variable

Health workers density; been described as the health worker availability at the various facilities- a total number of current health workers for all the facilities (hospital, health center and CHPs) was created and used as a count variable.

3.8.2 Independent variables

Independent variables are identified as

1. Socio- demographic characteristics of respondents

- Sex: as reported by respondents (Male or female)
- Age: age of respondent
- Marital status: reported as Married or unmarried
- Education level: highest certificate obtained(certificate, Diploma, Degree, Postgraduate)

- Religion: Denomination of respondents (Christianity/Islam/)
- Ethinicity: respondents ethnic group (Akan,Ewe, Northerner, Others)
- Facility level: Hospital, Health Center, Chps
- Facility ownership: Government, Private, Chag
- Household size
- Period of stay: period of stay in the district by respondents given in years
- period of work: years of work in the district by respondent
- work experience: number of years of work as a health worker by respondent
- period in facility: years of work in the facility by respondent
- working days: number of days worked in a month
- working hours: number of hours worked in a day by respondent
- patients per day: Number of patients attended to by respondent
- break period: hours of break enjoyed by respondent in a day
- off days: number of days given as days off in a month

2. Staff strength.
   - Number of health workers: presented as count variables
   - Qualification: Recognized practitioner of a profession (Professional/ non-professionals) Skills/Mix: Areas of expertise

3. Capacity of health facilities.
   - Organizational structure
   - Level of the facility
   - Key facilities logistics

4. Health system factors

    - Management Support: willingness of management to promote innovation and provide resource for their workers
    - Professional development: process of improving and increasing capabilities of staffs through provision of system to encourage career growth
    - Migration: movement of staffs from one institution to another, district, region or abroad(measured as binary “No”/ “Yes”)

Other Variables

The choice of independent variables in this analysis was guided by the conceptual framework of the study. Described as; fourteen binary variables including lighting condition, sanitation facility, water, ventilation, cleanliness, space , storage, refrigerator, stationary, basic instrument, beds, wards, linen- labeled as physical conditions and equipment. Essential drugs with categories of “no” and “Yes” was checked based on the list of essential drugs by Ministry of Health provided as the appendix E.

Categories variables namely job description, rotation system, training plans, career plans, Housing for Personnel, Incentives, labor laws & conduct, Task shifting policy and condition of service (with categories of “all”, “some”, “none”)

3.9. Data Handling

After successful completion of the field work which involves the data collection process, the data gathered was cross-checked, edited and coded for easy data entering and analysis.

3.10. Data Analysis

The first objective of this study was to examine the staff strength and mix of health workers in the district. The composition of all health workers, the distribution and the current staff numbers were solicited from the facility heads. These were segregated into professional and non-professional staffs. The proportions of the various cadres were calculated. Again, to accomplish the second part of the same objective; the distribution of health workers to doctor ratio for 2016 and 2017 was measured in ratios. The total number of nurses was estimated by adding the number of nurses from the various facilities for 2016 and 2017. The same estimates were performed for midwives and other cadres. Another cadre (physician assistant, laboratory technician, pharmacist, and biomedical scientist) was put together because their numbers were too few to estimate separate ratio for all. Similar estimates were performed in (Maier, 2017) and it is well known and extensively used for a measure of professional inequalities in health workers.

The second objective was to estimate the health worker density. The population density of a geographical location is calculated as the event per the area in square kilometer or miles. The population density for Amansie Central District is 127.1/km. However, in the context of this study; density of health workers is measured as the ratio of health workers to total population expressed per 1000 in habitants (WHO, 2007). The density for each health category was estimated by dividing it by the total population of the district. Data was described by the health category available and compared to the required numbers according to the Ghana Health Staffing norms (2015) for the years of 2016 and 2017. The gaps of this comparison were deduced. Full details of the various gap and density were elaborated at the results in chapter 4 on table 4.4.

The third objective sought to estimate the capacity of the facility towards access to health care. This objective was accomplished by cross-tabulating the various levels of the facility with the functional units the facility has. The functional unit was used to evaluate the service availability of a facility which depicts the community's access to that particular health service. Functional units were measured as a binary variable which denotes whether or not a facility has the required service. The associations between the variables were tested with chi-square and the proportions of obtained for the variables with their respective chi-square values.

The last objective on health system factors influencing health worker density was estimated in two parts. The Negative Binomial regression was used to answer the first part of the question. In the analysis of multivariate variables; there was the need to critically examine the data to elicit a clear understanding of the relationship between the variables. Therefore, the dependent variables were examined for the shape of their distribution. All variables were checked for outliers, missing values, and any illogical values. All missing values were removed from the analysis. Missing data under 10% are considered to be generally ignorable. A bivariate analysis was conducted to see how health facility characteristics are distributed. The dependent variable used was the current staff number which represented the health workforce. Since the workforce is the estimate used for calculating health density in a ratio of per population; it was considered the appropriate measure. The current staff number being a count variable was measured with the negative binomial regression.

The possibility of using a Poisson regression model is ruled out because of its strict assumption that the mean and variance of the dependent variable should be the same (Aditya Singh, 2016). The dependent variable in this study have equal mean and variance and exhibited a clear evidence of overdispersion and multicollinearity after

being tested for fit (estat gof). In such cases, the Poisson regression model usually produces inefficient estimates. A negative binomial model does not require the strict assumption of equality of the mean and variance, and it allows for unmeasured characteristics that generate over-dispersion in the count data. Hence, a negative binomial model is preferred over a Poisson regression.

The results of the negative binomial regression have been presented in the form of ***coefficient***, which can be obtained by using option in the Stata 14 software package. A coefficient value implies that an increase in the dependent variable is associated with an Increase in the outcome variable, and vice versa. P-values and confidence intervals for estimates were also provided.

3.11. Ethical Considerations

The research was appropriately recognized and acknowledged by all the authorities referred. The selection of respondents was randomly and voluntarily. The respondents could withdraw from the study at any time. The researcher also ensured anonymity and confidentiality of the responses provided by the respondents. All literature reviewed for the study was duly referenced to avoid plagiarism.

3.12. Assumptions of the Study

The study critically examined the influence of staff strength and quality of care; taking into consideration patient- worker ratio, capacity of health facilities and evaluating it with health care delivery, health density while exploring some health system factors influencing health workers desire to stay in rural areas. The study serves as a recommendation for the district and further studies. Finally, this study intends to serve as bases for further deliberation on redistribution of health workers to deprived areas in the region

3.13. Limitations of the study

The study has few limitations that must be noted though it presents empirical findings that shows success in policy implication and contribution in literature. The current study mainly used cross-Sectional data which may pose challenges with change of situations over a period of time. The study was also challenged with the absence of some health professionals due to leave periods. Questionnaire was filled with a faceto-face interview of respondents on the third objective (facility capacity in access to care). However, responds may be subject to bias since lower- level health workers generally have limited information about their facility.

The regression analysis that was conducted to achieve the fourth objective focused mainly on the responses by the facility heads (managements). The reason being that facility heads were the respondents who could give the appropriate response to the questions. Therefore, the smaller sample size (11) may to an extent inhibit the underlying rulebooks of regression statistics.

3.14. Reliability and Validity of study findings

A set of factors were identified through an extensive literature to influence health worker density at the various facility levels; hospitals, clinics and CHPS compound. The responses on the factors were tested with Cronbach's Alpha Model to check the questionnaire's scale reliability and consistency among the responses provided. The Cronbach's Alpha is suitable to determine the internal consistency with respect to the inter-item covariance and scale reliability.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter outlays results and findings from the analysis of the empirical data that was gathered in order to achieve the stated objectives of the study. The results comprise of the demographic characteristic; results on assessing staff strength and mix and estimating health worker density in the study area. The study also presented results on the capacity of the various facilities whiles evaluating the health system factors influencing health density towards universal health coverage.

4.1. Descriptive on Respondents Place of Work

In all, the analysis included the names of sixteen communities from the Amansie Central District where the respondents' facilities of work were located. However, table 4.1 presents results on the list of communities which had a frequency of more than 5 respondents (being a health worker and/or facility head). Those communities with respondents ≤ 5 were all summed up to be included as the results of others. The pool results show the results for all the respondents included in the study while a disaggregated result was presented for the health workers (general staff) and facility heads (Management) which formed the stratification of the sample. The results from the table 4.1 signify that more than half (55%) of health workers were at Jacobu while a handful of 7% and 6% were working in facilities at Atobiase and Tweapease respectively. One (1) respondent each was interviewed from the communities for facility heads while 2 (18%) respondents were being interviewed at Jacobu, the district capital. The table 4.1 below gives an in-depth background of the various communities where the respondents work.

Table 4.1: Respondents' place of work

Names of Communities	Pool Results n = 175	Health Workers n=164	Facility Heads n = 11
	Freq (%)	Freq (%)	Freq (%)
Apitisu	6 (3)	5 (3)	1 (9)
Atobiase	12 (7)	11 (7)	1 (9)
Fiankoma	9 (5)	8 (5)	1 (9)
Hia	7 (4)	6 (4)	1 (9)
Jacobu	96 (55)	94 (57)	2 (18)
Mile 14	7 (4)	7 (4)	0
Numereso	6 (3)	5 (3)	1 (9)
Tweapease	11 (6)	10 (6)	1 (9)
Others	21 (12)	18 (11)	3 (27)

Source: Field survey 2018

Others include the list of communities whose frequencies were not up to 5 under the total respondents' pool results. Such communities under the district included in the study were Abuakwa, Akatachieso, Biribiwomanmu, Fahiakobo, Fenaso, Hiayeya, Kofihwikrom, and Oseikrom. The results indicated that more of the respondents worked at the Jacobu community in terms of the pool. This could be attributed to the fact the health workers and facility heads preferred to work at district hospital being located at Jacobu. Also, the district hospital has the capacity to employ more health workers. Notwithstanding, the study showed respondents from all the major and minor towns of the Amansie Central District.

4.2. Socio-Demographic Characteristics of Respondents

The pool results (table 4.2) showed that the total number of females dominated (59%) as respondents compared to males (41%). Similarly, among the health workers interviewed more than half (60%) of them were females while 40% were males. However, this was not the case among the facility heads where 6 out of the 11 management staff were males while close to a tie (5) were females. This could also be

attributed to the dominance of females among some health cadres such as nursing and midwifery; yet, it also sounds an alarm that most women who are health workers do not ascend to the managerial positions as facility heads. In terms of marital status, the majority (52%) of the respondents were unmarried as presented under the pool results. This showed similar results for both health workers and facility heads recording 52% and 60% respectively for unmarried as compared to married respondents.

Table 4.2: Demographic Characteristics of Respondents

Demographics	**Pool Results n = 175** Freq (%)	**lth Workers n= 164** Freq (%)	**Facility Heads n = 11** Freq (%)
Sex			6
Male	71 (41)	65 (40)	(55)
Female	104 (59)	99 (60)	5 (45)
Marital Status			5
Married	84 (48)	79 (48)	(45)
Unmarried	91 (52)	85 (52)	6 (55)
Education			2
Certificate	108 (62)	106 (65)	(18)
Diploma	46 (26)	39 (24)	7 (64)
Degree	16 (9)	14 (9)	1 (9)
Postgraduate	5 (3)	4 (2)	1 (9)
Religion			
Christianity	170 (97)	159 (97)	11 (100)
Islam	5 (3)	5 (3)	0
Ethnicity			9
Akan	151 (86)	142 (87)	(82)
Ewe	4 (2)	4 (2)	
Northerner	17 (7)	11 (7)	2 (18)
Others	7 (4)	7 (4)	
Facility Levels			1
Hospital	87 (50)	86 (52)	(9)
Health Center	71 (40)	62 (38)	9 (82)
CHPS Compound	17 (10)	16 (10)	1 (9)
Facility Ownership			8
Government	78 (44)	70 (43)	(73)

Private	3	(2)	2	(1)		1	(9)	
CHAG	94	(54)	92	(56)		2	(18)	

Source: Field survey 2018

The majority (93%) of the respondents were Christians. However, among the facility heads all the respondents interviewed were Christians (100%). Akan represented the major (97%) ethnic group under the pooled results. In addition, there were 2% of Ewes, 7% Northerners and 4% others as shown on the pooled results. Others included respondents who were from Ga and India. From the results shown in table 4.2, 62% of the respondents were certificate holders, 26% possessed a diploma in their profession of practice, and 9% of the respondents hold a degree while a few of 3% possessed a postgraduate degree in their professional practice.

In terms of the facility level, respondents interviewed showed the highest percentage working at a hospital (50%) followed by those working at the health center (40%) and 10% for CHPS compound for the pool results. Similar results were shown for the disaggregated data for respondents under health worker category; where 52% of them worked at the hospitals, 38% worked at health centers and 10% who worked at the CHPS compound. However, under the Facility heads category, majority of the respondents interviewed were working at health centers and 9% each at the hospitals and CHPS compound. Finally, it was ascertained that more than half (54%) of the respondents worked for the Christian Health Association of Ghana (CHAG), and about 44% also worked for government-owned facilities while a few of 2% worked for the privately owned facilities in the district in pool results. Table 4.2 (page 28) gives a detail description of results for the demographic characteristics.

The subsequent table 4.3 shows the results for the count variables for the pool as well as for both health workers and facility heads. The variables presented include the

respondents' age, household size, the period of stay, work experience, the period of stay in the facility. It can be seen from the results that the average age for a respondent was 30 years as a health worker with a minimum age of 23 years and a maximum of 48 years. On the other hand, the minimum and maximum age for a facility head were 29 and 63 years respectively with an average of 35 years. This signifies that the respondents were matured enough to give responses to the research questions. The pooled results also revealed that the average household size for a respondent was 3 with similar results for both health workers and facility heads. The average period of stay of a respondent in a community of work was 5 years, 4 years and 6 years for the pool results, health workers and facility heads results respectively.

Table 4.3 expounds on detailed results.

Table 4.3: Socio-Demographic Characteristics of Respondents

Demographics	Pool Results n= 175		Health Workers n= 164				Facility Heads n= 11			
	Mean	Std. Dev	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Age	32.6	6.663	30.1	3.635	23	48	35	9.69	29	63
Household Size	2.9	2.039	2.5	1.942	1	12	3.2	2.136	1	6
Period of Stay	5.3	2.459	4.3	2.768	1	14	6.3	2.149	4	10
Period of Work	5.3	2.443	4.3	2.736	1	14	6.3	2.149	4	10
Experience	7.3	7.109	4.8	3.282	1	23	9.8	10.935	4	42
Period in Facility	3.2	3.085	3.3	2.663	1	14	3.1	3.506	1	10
Working Days (month)	23.5	3.319	23.6	3.347	19	31				
Working Hours	8.2	3.114	8.3	3.387	6	24				
Patients per day	22	40.201	22.1	40.082	2	300				
Break Period (minutes)	26.6	20.912	26.7	20.849	0	60				
Off Days per Month	6.5	2.911	6.5	2.946	0	11				

Source: Field survey 2018

The total observation with pool results 175 indicate responses for both health workers and facility heads while the other pool results of 164 limits the discussion to only health workers as used in the study. The results revealed that a health worker had an average of 4 years working experience while a facility head had an average 9 years working experience. It denotes that a health worker in a facility needs a work experience of over four years to attain a senior staff position. The average working days for a health worker were 23 days per month and an average of 8 hours. The health workers attended to an average of 22 patients, an average of 6 non-working days and a maximum break period of an hour (60 minutes).

4.2 Staff skill mix and strength

As pointed out by Maier (2017), key indicators of health workforce were presented as a distribution of health workers; disintegrating it into health worker by occupation, geographical region, facility type and the total number of health workers. Other key indicators projected were; nurse-physician ratio, the number of working hours and active workers. This study emulates some of the key results for the health workforce by presenting results on these key indicators in the study area.

4.2.1 The strength and skill mix of health workers

The distribution of health workers was cross-tabulated with the level of facilities. In terms of sex composition, the pool results for current staff showed 126 males and 207 females culminating into a total of 335 current staff. This was disintegrated into facility levels which comprised of a total current staff of 240, 90, and 5 at the various hospitals, health centers and CHPS compound respectively (table 4.4). However, the current female staff dominated among the pool and disaggregated results for the three facility levels, thus, 135, 69, and 4 for hospitals, health centers, and CHPS respectively. Again,

in terms of professionals and non-professional staffs, the results showed a pool total of 335 where 227 were professional and 58 non- professionals. Hospital recorded a total of 240, with a professional staff of 193 and 47 non- professionals. Health center showed a total of 90; professional staff of 79 and 11 nonprofessionals. CHPS recorded only 5 professional staffs making the same total.

Table 4.4: Number of Health Workers among Facility Levels

Distribution of Health Workers	Pool Results n= 335	Hospital	Health Center	CHPS
By gender				
Current Male Staff	127	105	21	1
Current Female Staff	208	135	69	4
By profession				
Professional Staff	277	193	79	5
Non-Professional Staff	58	47	11	0
Skill Mix (2016)	**n= 234**			
Doctors (2016)	5	5	0	0
Physician Assistant (2016)	8	5	3	0
Pharmacist (2016)	1	1	0	0
Pharmacy Technician (2016)	6	6	0	0
Biomedical Scientist (2016)	3	3	0	0
Laboratory Technician (2016)	5	4	1	0
Nurses (2016)	176	111	61	4
Midwives (2016)	30	18	11	1
Skill Mix (2017)	**n= 254**			
Doctors (2017)	5	5	0	0
P hysician Assistant (2017)	8	4	4	0
Pharmacist (2017)	1	1	0	0
Pharmacy Technician (2017)	6	5	1	0
Biomedical Scientist (2017)	2	2	0	0
Laboratory Technician (2017)	5	4	1	0
Nurses (2017)	185	115	66	4
Midwives (2017)	42	25	16	1

Source: Field Survey, 2018

Same on table 4.4, the skill mix and composition of health workers was also disintegrated into the hospital, health center, and CHPS compound; these were grouped

according to the various health staff category for the year periods of 2016 and 2017. The Pool results for 2016 showed results of doctors (5), physician assistants (8), Pharmacist (1), Pharmacy Technicians (6), biomedical scientists (3), Laboratory Technicians (5), Nurses (176), Midwives (30) and with a total of 234 health professionals. Disintegrated results showed records under the various facility levels; hospitals with a total of 153 health professionals, health center recorded 76 and 5 health professionals were found to be working in CHPS compound. With no much difference, the pool results for 2017 also revealed a total of 254 staff professionals; categorized into the various professions as doctors (5), physician assistant (8), Pharmacist (1), Pharmacy Technician (6), biomedical scientist (2), Laboratory Technician (5), Nurses (185) and Midwives (42). Though detail of the staff skill mix and strength is provided on the table (table 4.4), in 2017, hospitals (161) recorded the highest number of staff compared to the health centers (88) and CHPS (5) compound.

4.2.2 The distribution of health workers to doctor ratio for 2016 and 2017

To ensure a balance of health professional among the study area, results of ratios were presented for the years 2016 and 2017 as shown in table 4. Ratio 1 and 2 in table 4.5 showed results for the nurse to doctor ratio for 2016 and 2017 to be 35.2 and 37 respectively. It was evidenced in 2016 that there were 35 nurses to 1 doctor and 37 nurses to 1 doctor in the year 2017. This shows an increase in the stock of nurses in 2017. The ratio category 3 and 4 also showed results of the ratio of midwives to doctor 2016 and 2017 as 6 and 8.4. This also implies the ratio of 6 midwives to 1 doctor in 2016 as well as 8 midwives to 1 doctor in 2017. The details of the results as shown in the table 4.5 were between nurse and doctors, midwives and doctors as well as the ratio of all other cadres to doctors for the years of 2016 and 2017.

Table: 4.5: Ratio Estimation of Health Workforce

Number of health staffs	Freq (a)	Number of doctors	Freq (b)	Ratio (a/b)
Number of nurses 2016	176	Number of doctors 2016	5	35.2
Number of nurses 2017	185	Number of doctors 2017	5	37
Number of midwives 2016	30	Number of doctors 2016	5	6
Number of midwives 2017	42	Number of doctors 2017	5	8.4
Number of other cadre 2016	23	Number of doctors 2016	5	4.6
Number of other cadre 2017	22	Number of doctors 2017	5	4.4

Source: Field Survey, 2018

Other Cadres of health workers within this study comprises of the total of Physician Assistants, Pharmacists, Pharmacy Technicians, Biomedical Scientists, and Laboratory Technicians. The ratio 5 and 6 presented results for the ratio of other cadres to doctor as 4.6 and 4.4 for 2016 and 2017 respectively. These results are further illustrated and discussed using the bar graph below in figure 4.3. Generally, unlike the nurses and midwives ratio to doctors which showed an increase, other cadres to doctor ratio showed a minimal decrease of 0.2 between 2016 and 2017 representing 4.34 percentage decreases.

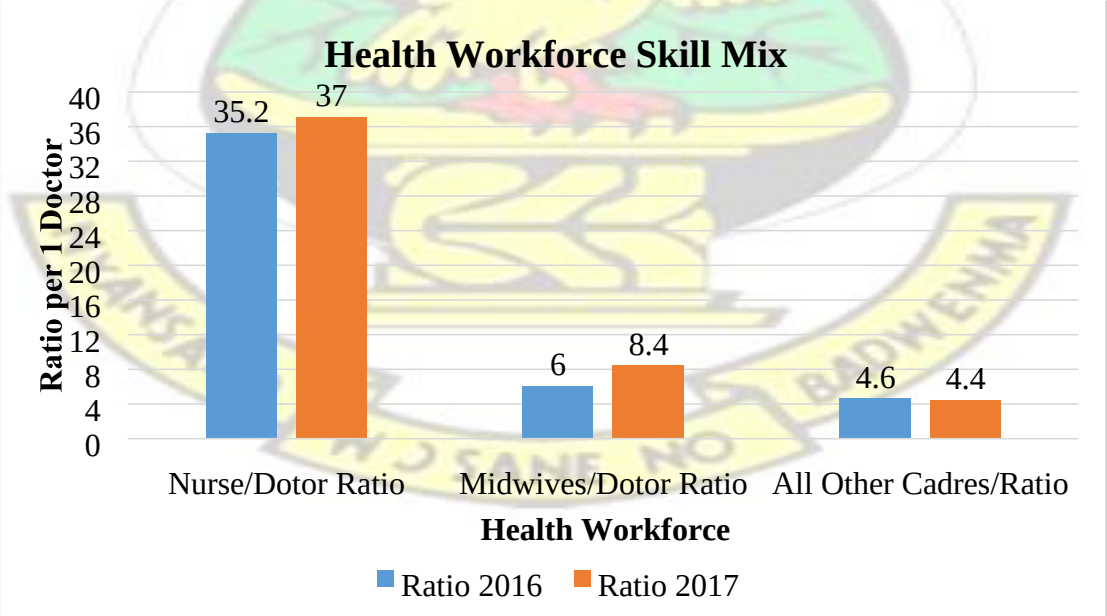

Figure 4.1: Health Staff Skills/Mix Ratio

Source: Field Survey, 2018

4.3 Estimating Health Worker Density

The second objective of the study solicited a response to estimate the health worker density in the district. The gap in health workers was presented as the difference between the available health profession and the required numbers according to the staffing norm of (MOH Report, 2015). The density was sought for the various health professions by estimating each health worker per 1000 population. The health worker density can be then compared to the minimum required threshold of 2.3 doctors, nurses and midwives per 1000 population that is essential for achieving the UHC and SDG.

Table 4.4 showed remarkable gab for the various health professions as included for the study. There is negative gap (-18) with respect to the available number of doctors for both 2016 and 2017. The health worker density per 1000 of the district population (103074) was 0.05 for both 2016 and 2017. Physician Assistants showed negative gabs (-9 and-10) for 2016 and 2017. However, it recorded a density of 0.08. Comparing the available Pharmacists to the required, the results also show gab of -4 and a density of 0.01 for both 2016 and 2017. However, nurses and midwives showed extreme gabs of -116 and -38 respectively. The density of nurses at the district was 1.71 and 1.79 for 2016 and 2017. Notwithstanding, the density of midwives for the district was 0.29 for 2016 and 0.41 for 2017. Table 4.6 explains it all about the distribution of uneven health workers density at the district.

Table 4.6: Distribution of Health Workers Density

	2016				2017			
Health Category	**Available n= 234**	**Required**	**Gap**	**Density**	**Available n= 254**	**Required**	**Gap**	**Density**
Doctors	5	23	-18	0.05	5	23	-18	0.05

Physician Assistant	8	17	-9	0.08	8	18	-10	0.08
Pharmacist	1	5	-4	0.01	1	5	-4	0.01
Pharmacy Technician	6	22	-16	0.06	6	23	-17	0.06
Biomedical Scientist	3	6	-3	0.03	2	6	-4	0.02
Laboratory Technician	5	30	-25	0.05	5	30	-25	0.05
Nurses	176	292	-116	1.71	185	305	-120	1.79
Midwives	30	68	-38	0.29	42	68	-26	0.41

Source: Field Survey, 2018

The empirical results in Table 4.4 are evident of low density among the various health professions which is below the stated required threshold of 2.3 by WHO (Maier, 2017),. This result, however, threatens the attainment of the Universal Health Coverage goal by the district. There is the need to also increase the number of trained health professionals in other areas such as pharmacy, midwives, laboratory technicians, biomedical scientist in order to ensure an integrated and even worker density. The bar chart is used to graphically present the results on the health worker density for the Amansie Central District if Ghana.

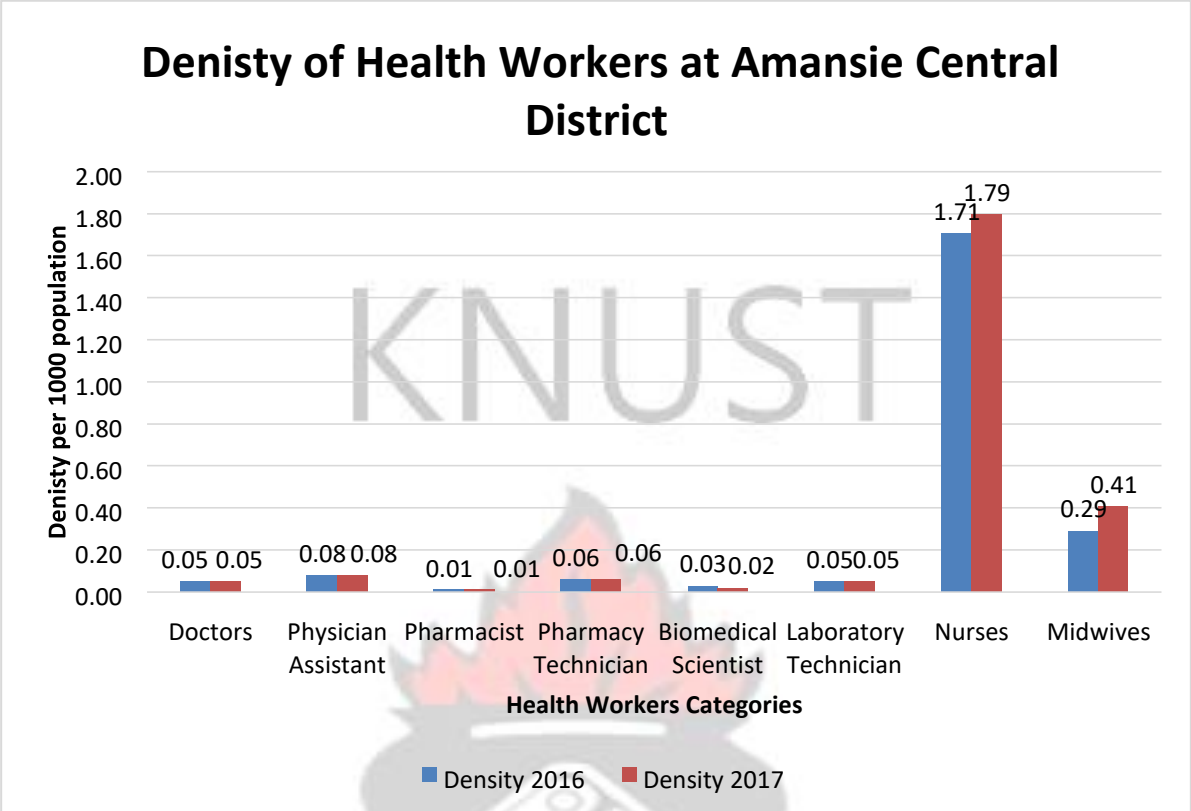

Figure 4.2: Health Worker Density for 2016 and 2017

Source: Field Survey, 2018

4.4 Health facilities capacity in relation to access to care.

4.4.1 Functional Units

This objective sought to estimate the health capacity of the various levels of the facilities with services delivery (functional units) at the study area. Functional unit has been interpreted as the service provided by the various facilities/service availability (Winter *et al.*, 2017). Functional units as presented in table 4.6 are captured under Maternity unity, OPD, Theatre, Ward and Emergency unit. Results in table 4.6 showed the results for functional units cross-tabulated with the various facility levels, their chi-square and the asterisk sign (*) denoting the levels of significance (p-value signs). The functional units were measured as a binary variable which denotes whether or not a facility has the required functional unity. Thus, "1" when the facility has a functional

unit says maternity and "0" when the facility has no maternity as required. In terms of the maternal unit, more than half (52.7%) provided maternal services (responded yes) within the hospitals they worked while the health center and CHPS compound also recorded 43.3% and 4.2% respectively.

The results showed a chi-square value of 98.57 for maternal services at a 1% significance level. It implies that, there is a strong association between maternal service provision and the level of the health facility within the study area. Therefore, this study rejects the null hypotheses which say there is no relationship between the two variables (functional unit and level of health facility).

Table 4.7: Distribution of Functional Units and Facility level

	Level of the Facility				
	Hospital	**Health Center**	**CHPS compound**	**Total**	
Functional Units	Freq (%)	Freq (%)	Freq (%)	Freq	chi2 (Pr)
Maternity Unit					
Yes	87 (52.73)	71 (43.03)	7 (4.24)	165	98.57 ***
No	0	0	10 (100)	10	
OPD					
Yes	87 (51.48)	71 (42.01)	11 (6.51)	169	57.74 ***
No	0	0	6 (100)	6	
Theatre					
Yes	87 (100)	0	0	87	175.00 ***
No	0	71 (80.68)	17 (19.32)	88	
Ward					
Yes	87 (61.27)	52 (36.62)	3 (2.11)	142	67.91 ***
No	0	19 (57.58)	14 (42.42)	33	
Emergency Unit					
Yes	87 (86.14)	11 (10.89)	3 (2.97)	101	126.79 ***
No	0	60 (81.08)	14 (18.92)	74	

Field Survey 2018

Note: Freq = Frequency, % = Percentages in parentheses and Chi2 = Chi-square value. The asterisk denotes levels of significance. *** is significant at 1%, ** is significant at 5% and * is significant at 10%.

However, 10 respondents (100%) from the CHPS compound stated that no maternal services were provided in their facility which could be interpreted as the inadequate

service availability for the community members. Similar results also revealed a positive association (chi-square value = 57.74 and 1% significance level) between OPD services and the facility levels. Again 6 respondents (100%) from some CHPS compound responded that there were no OPD services. Theatre services were provided only at the hospital level of the facility (100%). This implies that it is the only facility that provided such services. Health center and CHPS do not have the capacity to provide such services recording percentages of 80.7% and 19.32% respectively. The results also showed an association between the two categorical variables.

In terms of ward service provision, hospitals recorded 61.2% while the health centers and CHPS compound also showed 36.6% and 2.1%. This implies that some health centers (52.6%) and CHPS (42.2%) compounds had no wards service in their facilities. Lastly, service availability of emergency unit in the level of the facility showed 86.1% for the hospital, 11.9% for Health Center and approximately 3% for the CHPS compound. Results in the table showed that the district hospital provided all the stated services.

The study extended its scope to also explore whether the various facilities have the essential drugs such as emergency drugs for both general and maternal services and equipment as well as the reason for not having them. These variables were also measures as binary. Thus, "1" when there are essential drugs available at the facility and no when not available. Similarly, when there is available equipment in facilitating service provisions denoted as (1 for yes, 0, otherwise). The Pearson chi-square was also used to measure if there is an association between the list of equipment, a list of essential drugs and the level of facilities. The results (table 4.7) reported that there is a relationship between the list of essential drugs (ch2 value of 10.08 at 1% level of significance), list of equipment (ch2 value of 11.65 at 1% significance level).

Close to half (48.6%) of the respondents who worked at the hospital said there was an available list of essential drugs. But among the respondents who responded at the health centers and CHPS compounds, their responses for available list of essential drugs were 44.9% and 6.5% respectively. Yet, some respondents at the hospital (54%), health centers (24%) and CHPS compound (21%) indicated that there was no list of essential drugs provided at the facilities. Also, a similar response was shown for equipment availability however health center recorded 46.7% as against 43% for the hospital. Reasons for non-availability of the drugs were given as: not been purchased (54.5% for hospital; 9.1% for health centres; and 36.3% for CHPS), out of stock (87.5% for hospital; 6.2% for both health centres and CHPS compound), not available at medical stores (100%) at Health Centre) and others (50% each for Health Centre and CHPS).

Table 4.8: Distribution of Health Capacity and Facility levels

	Level of Health Facility				
	Hospital Freq (%)	Health Center Freq (%)	CHPS compound Freq (%)	Total Freq	Chi (2)
List of Essential Drugs					
Yes	67 (48.55)	62 (44.93)	9 (6.52)	138	10.08 ***
No	20 (54.05)	9 (24.32)	8 (21.62)	37	
If No Why (Reasons) Not Purchased	6 (54.55)	1 (9.09)	4 (36.36)	11	
Out of Stock	14 (87.50)	1 (6.25)	1 (6.25)	16	
Not Available	0	4 (100)	0	4	
Others	0	3 (50)	3 (50)	6	
List of Equipment Yes	59 (43.07)	64 (46.72)	14 (10.22)	137	11.65 ***
No	28 (73.68)	7 (18.42)	3 (7.89)	38	

Field Survey 2018

Note: Freq = Frequency, % = Percentages in parentheses and Chi2 = Chi-square value. The asterisks denotes levels of significance. *** is significant at 1%, ** is significant at 5% and * is significant at 10%.

This implies that majority of the reasons why health center do not have the required drugs for their patients is due to non-availability of the drugs at the Medical stores.

Hospital, on the other hand, runs out of stock for the required drugs as well as not been purchased. Majority of the respondents exclaimed that there was available equipment at the health centers (46.7%) followed by the hospital (43.1%) and CHPS compound (10.2%). Also, the hospital recorded the highest percentage for nonavailability of equipment of 73.7%, Health center (18.4%) and 7.89% for CHPS compound.

4.4.2. Physical conditions for quality health care

The study explored a list of physical conditions necessary for the provision of quality care in the health sector towards the achievement of the Universal health coverage goal as identified in "Tools for Assessing the Operationality of District Health System". Again, these physical conditions and equipment were segregated into the level of facility and tested with Pearson chi-square.

In table 4.8, the results fail to reject the null hypothesis that there is no relationship between four (4) out of the thirteen (13) physical conditions (lighting condition, sanitation facilities, and stationary) and level of facilities. The details of the results indicated that in terms of good lighting conditions, 50 % of the respondents who said yes were at the hospitals while 40% and 10% of the respondents were at the health centers and CHPS compound respectively. Majority of the respondents at the hospital said yes (48.18%) there was sanitation facility. Yet, 63.1%, 28.9% and 15.7% of the 38 respondents complained that there is no sanitation facility at the hospitals, health center, and CHPS compound respectively. This could probably be explained as the lack of required standards of sanitation equipment and disposal facilities in our health system. The total results show that 161 (92%) of the respondents had stationary while

8% representing 14 respondents said otherwise.

Table 4.9: Distribution of Health Physical Conditions and Facility levels

	Hospital	Health Center	CHPS compound	Total	
Physical Conditions	**Freq (%)**	**Freq (%)**	**Freq (%)**	**Freq**	**chi2 (Pr)**
Lighting Condition					
Yes	87 (50)	70 (40.23)	17 (9.77)	174	1.47
No	0	1 (100)	0	1	
Sanitation Facilities					
Yes	66 (48.18)	60 (43.80)	11 (8.03)	137	3.76
No	24 (63.16)	11 (28.95)	6 (15.79)	38	
Water Condition Yes					
	81 (52.60)	60 (38.96)	13 (8.44)	154	5.11 *
No	6 (28.57)	11 (52.38)	4 (19.05)	21	
Ventilation					
Yes	68 (44.74)	68 (44.74)	16 (10.53)	152	11.49 ***
No	19 (82.61)	3 (13.04)	1 (4.35)	23	
Cleanliness					
Yes	77 (47.24)	70 (42.94)	16 (9.82)	163	6.25 **
No	10 (83.33)	1 (8.33)	1 (8.33)	12	
Space Condition					
Yes	57 (46.340	57 (46.340	9 (7.32)	123	6.79 **
No	30 (57.69)	14 (26.92)	8 (15.38)	52	
Storage Condition					
Yes	67 (46.53)	65 (45.14)	12 (8.33)	144	7.44 **
No	20 (64.52)	6 (19.35)	5 (16.13)	31	
Refrigerator					
Yes	74 (49.66)	65 (43.62)	10 (6.71)	149	11.61 ***
No	13 (50)	6 (23.08)	7 (26.92)	26	
Stationary					
Yes	82 (50.93)	64 (39.75)	15 (9.32)	161	1.26
No	5 (35.71)	7 (50)	2 (14.29)	14	
Basic Instrument					
Yes	74 (48.37)	65 (42.48)	14 (9.15)	153	1.94
No	13 (59.09)	6 (27.27)	3 (13.64)	22	
Beds Condition					
Yes	72 (50.35)	64 (44.76)	7 (4.90)	143	22.13 ***
No	15 (46.88)	7 (21.88)	10 (31.25)	32	
Wards Condition					
Yes	73 (54.89)	56 (42.11)	4 (3.01)	133	28.96 ***
No	14 (33.33)	15 (35.71)	13 (30.950	42	
Linen					
Yes	73 (48.67)	68 (45.33)	9 (6)	150	21.01 ***
No	14 (56)	3 (12)	8 (32)	25	

Field Survey, 2018

Note: Freq = Frequency, % = Percentages in parentheses and Chi2 = Chi-square value. The asterisks denotes levels of significance. *** is significant at 1%, ** is significant at 5% and * is significant at 10%.

The results on the basic instrument which also had no statistical relationship with the level of the facility also posited that 157 (87%) of respondents had those equipments at their facility while 22 (13%) responded non-availability of basic instrument.

In addition, there were nine (9) physical condition variables that were found to have a statistical relationship with the facility levels. These variables were found out to be significant 10% (water condition), 5% (cleanliness, space condition, and storage condition) and 1% (ventilation, refrigerator, beds, wards and linen conditions) respectively. From the pool results, the least responses of people who indicated the availability of the nine (9) physical conditions show 123 space condition - 70%) out of the 175 total respondents while the highest recorded physical condition was 163 (cleanliness – 93%). The detail of responses from the study area can be explored on table 4.7 (page 63-64).

4.5: Factors affecting health worker density: Evidence among facility heads

While the 10 factors were identified to have influence health worker density at various facility levels, an analysis was done to assess the extent to which health managements provided these services to their staff or health workers. The Health managements were asked to indicate a score for none existence of the factor, some extent of application and whether all staff benefit from the identified factors by a 3point scale of 1, 2, and 3 respectively. These factors were tested with the Cronbach's Alpha Model to check its reliability and consistency among the respondents. The value of the Cronbach's Alpha (0.5838) indicates that there is indeed internal consistency with respect to the inter-item covariance and scale reliability of the way they responded to the statements. Leave

policy was held constant in the analysis sample (all the 11 respondents provided their staff with leave policy- 100%) so it was excluded from the Cronbach's Alpha test.

Table 4.4.1 explains that labor policy had the highest average score (3.0) followed by job description (2.6) and rotation system (2.5). These factors seemed to be practiced among all the facility levels. However, incentives (1.7) and housing (1.7) for health professionals or personnel had the very least average score to mean that, it was provided to some but not all of the staff. This clearly shows that non-beneficiaries of such factors will decide to leave their facility because of their perception of being discriminated. The table presents insight about the scores for each factor by the 11 health management heads.

Table 4.10: Average score of factors influencing health worker density

Factors	None 1	Some 2	All 3	Average Score
Leave policy	0	0	11 (100%)	3.0
Job description	1 (9.1%)	2 (18.2%)	8 (72.7%)	2.6
Rotation system	2 (18.2%)	2 (18.2%)	7 (63.6%)	2.5
Task shifting policy	2 (18.2%)	3 (27.3%)	6 (54.5%)	2.4
Career plans	2 (18.2%)	4 (36.4%)	5 (45.5%)	2.3
*Training Plans	4 (36.4%)	1 (9.1%)	6 (54.5%)	2.2
Conditions of service	5 (45.5%)	2 (18.2%)	4 (36.4%)	1.9
Labor laws and code of conduct	6 (54.5%)	1 (9.1%)	4 (36.4%)	1.8
Housing for personnel	5 (45.5%)	4 (36.4%)	2 (18.2%)	1.7
Incentives	5 (45.5%)	4 (36.4%)	2 (18.2%)	1.7
Total observations	11	Average Index Score		2.2
Cronbach's Alpha Results				
Number of items in the scale:	9			

Scale reliability coefficient:
0.5838

Source: Field Survey, 2018

This section provides the results of the negative binomial regression analysis that was conducted to examine the factors affecting health worker density among facility heads at the Amansie Central District. The analysis included 11 facility heads from 16 health facilities. The dependent variable, health worker density was a count variable which is the current numbers of staff in 2018 with an average of 30 staff. Table 4.9 shows the descriptive statistics of the variables used in the analysis. It was evidenced that, as high as 90% of the facility heads provides a job description to the entire staff to maintain them. Furthermore, more than half (81%) has a rotation system and approximately, 63% also provided training opportunities to staff. The majority (55%) also indicated that there were no labour laws and conduct while a proportion of 45% also said otherwise. Table 4.9 gives an in-depth overview of the variables.

Table 4.11: Descriptive statistics of the variables

Variable	Mean	Std Dev	Min	Max
Dependent variable				
Current Staff Number	30.45455	69.60225	5	240
Independent variables				
Job Description	1.909091	.3015113	1	2
Rotation System	1.818182	.4045199	1	2
Training Plans	1.636364	.504525	1	2
Career Plans	1.818182	.4045199	1	2
Housing for Personnel	1.545455	.522233	1	2
Incentives	1.545455	.522233	1	2
Labour Laws & conduct	1.454545	.522233	1	2
Task Shifting policy	1.818182	.4045199	1	2
Conditions of service	1.545455	.522233	1	2

Source: Field Survey 2018

Table 4.12 provides the results of the negative binomial regression. The output begins with the header information (name of the model), the dispersion which is around the mean and the final value of the log likelihood for the full model displayed again as 33.313425. On the right –hand side begins with the number of observation (11) used in the analysis. This is followed by the Wald chi-square statistic (29.34) with 9 degrees of freedom for the full model. Subsequently, the p-value for the chi-square is a test of the model as a whole. From the p-value (0.0006), it is observed that the model is statistically significant. The header information of the right also depicts a pseudo-R^2 of 0.3 which signifies a good adequacy of the regression model. Below the header information, the model shows the coefficient, standard error, incident rate ratios along with the associated sign of the p-values, z-scores and 95% confidence intervals.

Except for four (4) variables, the remaining five (5) were significant predictors of health worker density, even in the final model (constant) which introduced all the variables together. Job description, training plans, housing for personnel, labour laws and conduct as well as conditions of service, turned out to be significant. With respect to the magnitude of effects, the five factors had effects on the outcome, although the factor representing labour laws and conduct had a negative effect. The results highlighted that job description, training plans, housing for personnel and conditions of service have a positive and statistically significant effect on health worker density.

The study presented the binomial regression results as an incident rate ratio in addition to the coefficient. The number of health worker density was expected to increase by 3.061 if there is the provision of job description within the various facilities. The effect of providing housing for personnel was even stronger. The health worker density increased by 3.245 within the facilities at the Amansie Central District when there is housing for personnel. Conditions of service and training plans for staff was also associated with 1.730 and 2.592 respectively increase in the health worker density. On the contrary and also surprisingly, the number of health worker density was expected to reduce by 1.660 where there are existing labour laws and conduct among the health facilities. Since the explanatory or independent variable was binary (yes / no), the reference category was "no". The table (table 4.10) gives detailed results on the negative binomial regression.

Negative binomial regression		Number of Obs	= 11
		LR chi2 (9)	= 29.34
Dispersion	= mean	Prob > chi2	= 0.0006
Log likelihood	= -33.313425	Pseudo R2	= 0.3057

Table 4.12: Negative Binomial Regression Results

Current staff no.		Coeff	Std. Err	Z	95% Conf.	Interval
Job Description	No®					
	Yes	3.061253***	1.168618	2.62	.7708035	5.351702
Rotation System	No®					
	Yes	1.766322	1.211471	1.46	-.608117	4.14076
Training Plans	No®					
	Yes	2.591604***	.4225536	6.13	1.763414	3.419794
Career Plans	No®					
	Yes	.7236665	.4621019	1.57	-.1820366	1.62937
Housing for Personnel	No®					
	Yes	3.24489***	1.111766	2.92	1.065869	5.423911
Incentives	No®					
	Yes	-.457364	.9074807	-0.50	-2.235994	1.321266
Labor Laws & conduct	No®					
	Yes	-1.659709***	.7809523	-2.13	-3.190348	-.129071
Task Shifting policy	No®					
	Yes	-.0331632	.8475443	-0.04	-1.694319	1.627993
Conditions of service	No®					

Yes	1.73009***	.5576956	3.10	.6370267	2.823153
_cons	-16.60632***	4.587177	-3.62	-25.59702	7.615615
Likelihood-ratio test of alpha=0:	chibar2(01)	=0.16	Prob>=chibar2 =	0.344	

Source: Field Survey, 2018

To triangulate the factors that influence health workers to leave their facility, the respondents were asked to rank a set of factors identified through an intensive literature review. The Kendall coefficient of concordance or Kendall W was the statistical method that facilitated analysis of this result. It measures the agreement level among the factors ranked by the 104 respondents representing 63% who had the intention to leave their facility. From table 4.7, more than half of the health workers who had the intention to leave were at the hospitals while close to 39% and 10% were at the health center and CHPS compound respectively. Table 4.7 presents the frequency distribution of responses on the intention to leave the facility.

Table 4.13: Intention to leave Facility of Work

Do you have the intention to leave your facility Responses Results n= 164		**Hospital**	**Health Centre**	**CHPS Compound**	**Pool**
Yes	104 (63.4%)	53 (51%)	40 (38.4%)	11(10.6%)	
No	60 (36.6%)	33 (55%)	22 (36.7%)	5 (8.3%)	
Pearson chi2(2) = 0.3471 Pr = 0.841					
Cramér's V = 0.0460					

Source: Field Survey, 2018

The subsequent table 4.7.2 outlays the descriptive statistics on the factors by 104 respondents who expressed their intention to leave their health facility of work. The factors that influence people to leave the facility were 9. From the table, the highest rank among the variables was 1 while the least rank was 9. The Kendall W was used to measure the agreement among the rankers (health workers) or determine the overall of

how well the respondents agree with the ranks of the factors. From the table (4.7.2) on the descriptive statistics, the results displayed the number of observations (104) which runs through the responses for those who had intention to leave. The mean, standard deviation, minimum and maximum responses among the variables were also provided.

The results from the table 4.7.2 show that all the factors with the exception of factor 8 (community conflict) were ranked as high influencing factors by at least one (1) of the respondents. Similarly, all the factors from factor 1 to factor 9 received the lowest rank of 9 each from one of the respondents.

Table 4.14: descriptive statistics of factors that influence people to leave

Descriptive Statistics

Why do you intend to leave	N	Mean	Std. Deviation	Mini 1	Maxi 9
1. To earn a better income	104	5.33	2.556		
2. Better Career Prospects	104	4.30	2.207	1	9
3. To further education	104	3.11	2.029	1	9
4. Child's Education	104	3.82	2.445	1	9
5. Relocation of partner	104	4.50	2.449	1	9
6. Moving to a preferred location	104	4.83	1.992	1	9
7. Extended family commitment	104	5.99	2.300	1	9
8. Community conflict	104	7.56	1.869	2	9
9. Poor accommodation and infrastructure	104	5.50	2.569	1	9

Source: Field Survey, 2018

The results form Kendall coefficient or Kendall W ranges from Zero (0) – One (1). So the case of 0 means perfect disagreement (they do not agree with any of the identified factors) among the rankers (health workers). The case of 1 is a perfect agreement which connotes that all the ranks match for every factor identified. The table 4.7.3 shows

Kendall's W test for the rankings. It was indicated that the highest influencing factor that made health workers leave their facility is to further their education (3.11) and the least influencing factor was community conflict (7.57). Other 3 high influencing factors to influence people to leave their facility were an education for children (3.82), better career prospects (3.82) and relocation of partners (4.51). The table 4.7.3 gives details on the variables and associated rankings.

Table 4.15: Rank of factors that influence people to leave

Factors	Mean rank
To further education	3.11
Child's Education	3.82
Better Career Prospects	4.30
Relocation of partner	4.51
Moving to a preferred location	4.85
To earn a better income	5.33
Poor accommodation and infrastructure	5.51
Extended family commitment	6.00
Community conflict	7.57
Test Statistic	
Number of observation	104
Kendall's W[a]	.229
Chi-Square	190.201
Df	8
Asymp. Sig.	.000

Source: Field Survey, 2018

Taking a look at the test statistic table (table 4.7.4), it was discovered that the number of observation used for the study was 104 because it represents all those who responded yes within the three facility levels. The Kendall's W shows a statistic value of .229, a reasonable level of agreement. The chi-square value was 190.201 with a degree of freedom (df) value of 8 because we have 9 variables ranked by the respondents. Finally, the significance level showed on the table 4.7.4 was 0.001.

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This chapter presents a discussion on findings from the analysis of the previous chapter. The results were discussed in line with the findings of the analysis presented as demographic characteristics, staff strength and mix, health worker density as well as factors influencing health worker density. The chapter also explores findings discussed in other literature.

5.1. Respondents Place of Work

Sixteen communities were presented in the results describing where respondent's facility of work is located in the district. From table 4.1, Jacobu recorded a pool percentage of 55% and 18% for facility heads. Jacobu being the largest populated sub-district where the only hospital is situated, as well as employing majority of staffs in the district may have accounted for the majority of respondents as shown in the results. Atobiase and Tweapease described as the second and third biggest facilities in the district recorded 7% and 6% respectively. However, the other facilities serve the remaining population of about 63.8% in the district and while the hospital holds the majority of staffs in the district may imply that other facilities needs more of the human resource.

5.2. Socio-Demographic Characteristics of Respondents

The pool results from table 4.2 showed 59% of health professional dominated by females compared to 41% of males indicating the dominance of females in the

Nursing and Midwifery profession. Results presented in (Ageyi-baffour *et al.*, 2013) showed 100% respondents being female in a study conducted to explore "factors influencing midwifery students in Ghana when deciding where to practice". This affirms the finding of the study suggesting female dominance; yet, 6 out of 11 female management staff also sounds an alarm that most women who are health workers do not ascend to the managerial positions as facility heads. These results were consistent with the work by (AMREF Report, 2012), however, these results were in contrast with a study conducted in Ethiopia showing deployment of more males both before and after decentralization (Michael *et al.*, 2015).

Unmarried respondents showed pool results of 52% compared to 48% married respondents. Again (Ageyi-baffour *et al.*, 2013), gave an account of 96.6% being unmarried during midwifery training; this findings probably may be attributed to the fact that newly posted staffs may want to work for a few more years before marrying. This could probably account for more unmarried health workers in the district.

Education was presented in the study as the professional certificate a health worker possesses. This results showed certificate holders with 62%, Diploma (26%), degree (9%) and 3% for postgraduates. This may be an evidence of training and deployment of more certificates trained staffs; though the evidence is inconclusive, the study envisions a health system with deficient numbers of diploma and degree holders. The findings are not different from a report by HASS (2017) which gave accounts of halfyear nursing staff analysis of 2017 as; diploma holders being nurse and midwives (24.5%) and certificate holder (Enrolled nurses and community health nurses) to be 42.2% for Ashanti Region.

These findings may presents implications for the attainment of coverage of health interventions and will require further measures by HRH. This vertex suggests the need to strengthen and recruit more of diploma and degree holders. Christianity dominated with 97% of the respondents as against a 3% Islamic religion. This indicates that Christianity is substantial in the study area which supports the nationwide estimates of 71.2 percent and 17.6 percent for Christianity and Islam respectively (GSS, 2012).

In terms of the facility level, respondents interviewed showed the highest percentage working at a hospital (50%) followed by those working at the health center (40%) and 10% for CHPS compound for the pool results. Again, the results to facility ownership showed that majority of 54% of the respondents, government (45%) and CHPS (2%).CHAG owns the only hospital in the district with almost twice the number of health workers as compared to government facilities in the district (Amansie Central Report, 2016). In terms of ownership, the results are contradicted by a report by Ghana Health Service (2016) stating a percentage of 66% workforce for GHS, 16% for CHAG, 11% and others. However, a similar study conducted in Nepal (Baral *et al.*, 2013) reported on hospital holding majority of staffs.

5.2.1 Health Workers Characteristic

Table 4.3 showed results for health workers characteristics; variables presented include the respondents' age, household size, the period of stay, work experience and period of stay in the facility. Mean results for age was 33 years for pool results; an average of 30 years for health workers and 35 for facility heads. The mean household size of 3 for both health worker and facility heads. This indicated that health workers in the district are mainly in their mid-ages of life, active and knowledgeable in their professions of

practice. Most of the professionals spend three to four years in school and by the time they graduate and start working, they may be between 24-30 years.

Also, doctors spend close to eight years in school and expected to graduate in their late 20s and 30s. This correlates with a study by (MOH, 2014), " Holistic Assessment Report" reported on age distribution of some selected categories of doctors, nurses and midwives suggested that; majority of doctors in working population were young, nurses with peaks of 25-34 years, midwives on the other hand span between 25-34 and 55-60.

Results showed that the health worker has stayed in the district for a period of 5 in pool results as presented in table 4.3; 4 years for health workers and 6 for facility heads. This same result was shown in respondents' period of work; this implies that health workers basically stay in the community of work and interact with the community members; this was affirmed in a study (Sato *et al.*, 2017) showing results of similar percentages for time in current profession and time in current health facility of 1-3 years. However, respondents reported of a 3 years mean to stay in their facility of work and a work experience of 7 years for pool results, segregated into 5 years work experience for health workers and 10 years for facility heads. The results can be attributed to the fact that health workers in the community may have worked in some other facilities considering the mean age of 33years. Though the district is deprived and seems to have inadequate social amenities some health workers may have obtained for transfer to work in the district. This may signify that if some attractive social packages are put in place by the district may attract more health workers.

Also in the table is a presentation of results showing mean days of work to be 24 days with a minimum of 19 days and a maximum of 31 days of work. Working hours was reported as a mean of 8(minimum of 6 to a maximum of 24). Doctors reported of

working 31 days and mostly 24hours as well as staffs at the sub-district. Some respondents gave accounts of being the only staffs of a professional category and therefore have to work throughout the month. These findings show working days and hours exceeding the “statutory working hours” for an employee according to the labor laws of Ghana.

5.2 Staff strength and skill mix

Skill mix described in the context of the study as a “combination of skills available at a specific time or range of activities that constitute every one's role” (Baral *et al.*, 2013)**.** Results shown in Table 4.4 presented distribution of Health workers according to gender composition; professionals and non -professional staffs among the various facilities. The pool results on gender composition across the three facility levels revealed that, currently, there are 126 and 207 representing males and females respectively reflecting earlier discussion on the dominance of female respondents. The majority (277) of the staff were professionals as compared to non-professional (58). A study by (OECD Report, 2018), reported on EU countries employment of health professionals and associated professionals to have risen by 12% over the decades and further estimated growth of 10% by 2025.

The result on the combination of the other health cadres (health skill mix) was presented for the years of 2016 and 2017. Findings from table 4.4 revealed a total of
234 for 2016 and 254 for 2017 for all cadres. Report from HASS half year review (2017), gave a record of staff strength of 10517 for Ashanti region. The report showed nurses of all grade accounting for a percentage of 57%, midwives (9.8%) and health assistants recording 5.1%. The report, however, goes on to present on staff distribution

in the region and cited Amansie central to account for a total of 1.6% of the staffs and ranked it as the 5th district with the lowest staff strength in the region.

Urban communities namely Kumasi and Ejisu recorded 13.1% and 5.7% respectively. These results are consistent with a study conducted in Nepal reporting of disparities in urban-rural workforce and distribution. A similar study conducted by (Aditya Singh, 2016) showed distribution composition of health workers in Primary health centers and community health centers, the study reported of inequalities in these facilities and explained that the high inequality may be as a result of overall shortages.

The study suggested that high inequality in the distribution could be as a result of the states not posting staffs according to their HRH policy. Inequalities in the rural health facilities are suggestive of impacting negatively on the health system in these places and require innovative redistributing methods. This requires that posting and distribution of staff be done in regards to the staffing norms stated in the Ghana Health Service Report (2015).

5.2.2 The distribution of health workers to doctor ratio for 2016 and 2017

Results also presented a ratio of the distribution of health worker to doctors in table 4.5. The results showed ratio 1 and 3; as a doctor to nurse ratio for 2016 and 2017 to be 1: 35 and 1: 37 respectively. Ratio 2 and 4 showed the ratio of doctor to midwives for 2016 and 2017 as 1: 6 and 1: 8 respectively. Last ratios of 5 and 6; was presented for doctor to other cadres as 1: 5 and 1: 4 for 2016 and 2017. It is reported that even though the exact impact of the numbers and mix of health cadres necessary for effective and efficient management of a health system is still not well established; the global ratio of 2.517 nurses/midwives to physicians is often used for future projections of the workforce (Liu and Scheffler, 2016). A study on health workforce by Maier(2017),

reported on key indicators of the health workforce and report on ratio of nurse to physician ratio for EU countries as 1: 2.4; countries such as Switzerland recorded 1: 4.4, Israel 1:1.5 and Russian Federation showing 1: 2. The ratio of doctor to nurse has seemingly revealed the extreme shortage of doctors and other professionals in the district. This ratio shows implication of the possibility of work overload by the deficiency staff and in the case of the study, doctors reported of working 31 days and 24hours a week.

5.3 Estimating Health Worker Density

Table 4.4 sought to explore various cadres of health workers available as against the required number of staffs according to the staffing norm of GHS (2016). The table presents the gaps of the various categories of health workers and their density. This is however grouped into the years of 2016 and 2017. The results showed a total of 229 deficit, a total density of 2.27 for 2016; a deficit of 224 and a density of 2.46 for 2017. Negative 18 gap for doctors for the years of 2016 and 2017. Pharmacist recorded a negative 4 gap, as well as a striking gap of negative 120 and 26 for nurses and midwives respectively for the year 2017. A study by (Liu and Scheffler, 2016) also reports on global demands, supply, need, and differences. It estimated Africa's demand, supply, and need; and stated the deficit as 11787. Liu et al elaborated that base on the need-based model the largest shortages will result in Sub- Saharan

African and South Asia (Liu *et al.*, 2017). A report by World Bank (2013) ranked Mozambique as one of the African Countries with the lowest health worker density with 0.3 doctors and 3.4 nurses per 10,000 people. However, Ghana is considered with a fairly good health worker density compared to other African Countries (Ghana Health Service Report, 2016).

The table also reports a density of 0.05 for doctors, 0.08 physician assistants, and 0.01 pharmacists for both years. It again revealed the density of nurses and midwives as 1.79 and 0.41. Nurses saw an improvement of 0.08 over 2016 and a 0.12 for midwives. However, it can be reported that the Nurse/ population ratio for the district is 1: 338 and midwives/population of 1: 1515. Doctor/population ratio was revealed as 1: 20615 and 1: 103,074 for pharmacist. Report by MOH (2014) gave an account of 5 years period nurse/population ratio, stating improvement in 2014 with a 1: 959 and ratio of doctor/population as 1: 9043. A study by Campbell et al., (2013) emphasized on increasing supply of health professional health in Ghana by approximately 1400. (Alhassan *et al.*, 2013) reiterated this by reporting on Ghana making considerable progress in many health outcome indicators. Agyei-Baffour *et al.*,(2013) also reported increased percentage deliveries attended by skilled health staff. Though there seems to be some improvement in the number of nurses and its density, the ratio of midwives, doctors and pharmacist still shows significant deficiencies in the district compared to both national and international ratios. Similar findings were shown in (Michael *et al.*, 2015), which presented on districts and their health workforce density.

The study concluded by stating that the density of some districts was low by both international and national standards. These results may suggest reduced health care delivery in the rural district as compared to urban areas. The findings support with a study by (Link, Drislane and Akpalu, 2018), stating that Ghana has great difficulty extending medical care to rural areas. Though Ghana is said to have made considerable improvement in its workforce over the years, yet there seem to have been not much improvement in the achievement of the universal health coverall goal. The density of health workers is nothing to delight ourselves of compared to the defined WHO

benchmark. The district, however, suffers from severe shortages of health workforce which may impact immensely on health indicator and require

rectification.

5.4 Health Facilities capacity

5.4 .1 Functional Units

Health facility-based services require a spectrum of a combination of resources, human, physical and/or infrastructure**.** Functional units presented on table 4.6 showed more than have or the respondents (52.7%) provided maternal services in the hospital they served, 43.3% of a health center and 4.2 % of CHPS Zones provided such services. The results suggested a strong association between maternal service provision and the level of facility with the study area. Maternal services are one of the essential services outlined in the health system. Importance of health workforce has been linked with maternal survival, child and infant survival indexes (Maier, 2017). Accessible maternal health care is stated as a critical component of the UHC goal categorized into family planning, antenatal, delivery and full child immunization (WHO Report, 2018). With a woeful 4.2% access to these services by CHPS zones to the communities they serve may causes an alarming impact on maternal health and UHC as a whole. Furthermore, health center and CHPS zones in the district serves the majority of about 63.8% of the population. A study by (Winter *et al.*, 2017) provide evidence of facilities with delivery service and establish that five countries namely; Bangladesh, Haiti, Malawi, Senegal and Tanzania had a majority of facilities with delivery services being in the rural areas.

Also, services for OPD showed a positive association with facility levels; with 100% of CHPS compound reporting of no OPD services. Theatre service was provided only at the hospital level (100%) which corresponds to the specification of the GHS staffing

Norm (2015). Again, hospitals recorded 61.2% torward service provision as against 36.6% and 2.1% for the health center and CHP zones respectively. This may suggest inadequate services of inpatients for majority of health centers since the activities of CHPS do not require major services of the ward unit. Emergency services were reported of by hospitals with 86.1%, 11.9% for the health center and 3% for CHPS facilities. All the major services were provided by the district hospital. Similar evidence was ascertained in a study by Winter et al., reporting of hospitals scoring the highest for service availability and readiness while health center scored lower results in the study involving five African countries. The study suggested that there was the need to invest more in service availability for health center since it constituted the majority of the facilities that provided delivery services. In the case of this study, the report from the district revealed the health center and CHPS zones were attending to the majority of the population. It has, therefore, become imperative that major investment is inputted in both structural and human resource.

The study again explored availability of essential drugs and equipment in the district. The results reported of a 1% level of significance for both essential drugs and equipment. Hospital respondents reported 48.6% availability, health center with 44.9% and 6.5% for CHPS zone. Non –availability was reported of by 54% for hospital, health center (24%) and 21% for CHPS zone. A similar response was shown for equipment availability with 46.7% for health center as against 43% hospital. Winter et al., stated that access to delivery care by itself is not sufficient to reduce mortalities and therefore become essential that facilities be equipped with the essential commodities necessary for the provision of services. The study revealed that all five countries lacked large proportions of commodities and medicines needed for necessary services. The findings

were confirmed by (IHME) in Kenya (2014), revealing minor differences in both equipment and pharmaceuticals stocks across facilities located in urban and rural areas.

Reasons for non-availability was reported as not purchased with majority of 54.5% for hospital, out of stock (majority of 87.5% by hospital respondents), not available at medical stores (100% for health centers) and others presented as 50% for both health center and CHPS Compound.

5.4 2 Physical Conditions for quality health care

Results for four of the physical conditions in table 4.8 failed to reject the null hypothesis of no association between the level of the facility. Good lighting was reported of by 50% of the respondents, 40% for the health center and 10% by CHPS Compound. The required Sanitation facility was reported by 48.18% of hospital workers. However, of the respondent who responded no to the sanitation facilities; 63.1% were from the hospital, 28.9% and 15.7% from the health center and CHPS compound respectively. Respondents reported to having the required stationary for work with percentages of 92 whiles 8% said otherwise. Aditya Singh (2016) found the association between the number of health workers and amenities in PHC and CHC; the study showed the effect of electricity reduced the number of health workers by about 8% in PHCs. PHC facility where there was no water supply reduced by about 4% in comparison to facilities with tap water. However, the study established no significance to toilet facility in its study. Though this study did not establish clear relationships to the density; however association established between having the required physical conditions and the facility level is suspected to have effects on health care delivery.

The results revealed no statistical association with the level of the facility, however, additional nine of the physical conditions were found to have a statistical relationship

with the level of the facilities. These variables showed statistical significance at 10% for water conditions, correlating with the findings of Singh (2016) as earlier discussed. These findings may further suggest respondents showing an intention to leave the facility of work.

Also reported of in the table are cleanliness, space condition, and storage facility showing a significant level of 5% and 1% for Ventilation, refrigerator for vaccine, beds, ward and linen (Institute for Health Metric and Evaluation, 2014), explained that most facilities in Africa provided service but lacked functional equipment, medicines and the needed logistics for care delivery with Ghana scoring as low as 27%. Health system in the rural areas can play effective roles towards the achievement of the universal health coverage goal if equipped with adequate human resource, essential drugs, equipment and infrastructure. Health centers and CHPS compound well equipped and in the district can help bridge the gaps of health care indicators.

5.5 Factors affecting health worker density

Various factors have been discussed in various literature and mostly been described by some literature works as the "Pull and Push" factors (Johansson, 2014). Some other literature categorized the factor under individualized, social, economic and political factors. Here in the study, the focus is on health system factors while exploring some social factors thought to influence health worker density (Scott and Govender, 2017). Health system factors presented in this study were broadly categorized under management support (Job description and task shifting policy), conditions of service and professional development (condition of service, job promotion, and training) and motivation factors (accommodation, transport availability, social services such as

banks, electricity portable water, allowances, study leave opportunities, availability of schools for children).

Results presented in this study reported on management support; showing statistical significance for job description and knowledge on task shifting policy. These two variables have been described as a supportive factor for a worker on their job performance. Workers exhibit clear knowledge and some level of confidence when given support in the areas of their job performance whiles motivating them in their work. A total of 155 respondents reported of been given a job description with the majority of them being staffs from the hospital (54.8%). Majority of the 9 respondents who reported of not been given Job description were from the health center. This may imply that management of the various health centers should consider these areas to improve upon performance. Others areas of management support reported were the condition of service; a total of 71 respondents attesting to been offer that support. However, the majority of the respondents 93 reported of not having the condition of service and out of this hospital recorded 59.1% from the total. Again, Monitoring and evaluation showed encouraging results of a total of 172 attesting to regular monitoring and evaluation. Out of a handful of 3 respondents who reported "No", 2 of them were from the hospital. Thought CHPS compound is situated in the remote areas of the district, they recorded a 100% management support towards regular monitoring. This may indicate that their activities of work do not go unmonitored. Authority in-charge of supervising and monitoring the activities of workers in these areas are constantly in check of their performance.

Most staffs would want their work recognized and also see themselves grow professional in their area of work through promotions. Job promotions are said to go along with some form of remuneration as well as recognition and motivation. The

results showed job promotion been affirmed by 155 respondents, hospital recorded a 54.2% and the remaining 9 who reported otherwise may signify staffs who have worked fewer years than required for promotion. Training opportunities were offered to 141 whiles 23 reported not having the opportunity to attend any training. Again hospital recorded a total of 52.2% of those who reported not having had any training that year.

Though factors reported on condition of service, monitoring, and evaluation, Job promotion and training was found not to have any statistical significance with the facility level and may not have much bearing of intention to leave ones facility; these have been recognized as important motivational factors for health workers in other studies (Aditya Singh, 2016). The difference in these findings may be attributed to the sample size used for the study.

However, results from the management heads of the facilities which were tested on negative binomial regressions showed a positive and statistically significant effect of the health workforce. These variables presented coefficients denoting an expected increase of some percentages with the provision of these support systems. Job description expected to show 3.061, condition of service by 1.730 and training by 2.592 increases in the health workforce. Contrary to no statistical significance in the health workers response, the results for the heads indicated the importance of offering these form of support to health workers. These have been reported in other studies such as (Ramani *et al.*, 2013), conducted a qualitative study to solicit response from some category of health worker. The study corroborates with the recent work where respondents reported on policies and management issues such as leave policy, rotation system and transfer within the public sector rural jobs. The study cited staff support, leave and other contextual factors to increase recruitment.

Also,(Chimwaza *et al.*, 2014), stated in findings of a qualitative study that intention to leave was related to poor management issues and cited lack of recognition and promotion as some factors. It again stated that, though respondents had the opportunities for in-service training, however, the choice of attendance was unfairness. (Songstad, 2012) reiterated on the fact that responsivity, training, and recognition played a major role in staff motivation in its findings. (Beck, 2012), identified important professional development factors as promotional avenue and training opportunities; further emphasized on its importance to workforce and competence. Ayalew and Abba (2015) also described opportunities for professional development as a significant turnover intention.

In the aspect of motivation, the present study showed the results of three factors that were statistically significant in the district and five other factors were not statistical significance to facility level. Transport, access to banking services and study leave showed a 1%, 10% and 1% significance level as stated. Variables such as accommodation (p-value 0.28), access to electricity (p-value 0.63), access to potable water (p-value 0.85), children access to quality education (p-value 0.33) and staff allowance (p-value 0.13) were shown to have no statistical significance to the facility level. Motivation has been linked in some studies to staff performance (Buabeng and Partial, 2016). Though remuneration in the forms of allowances and salary has been identified as a form of motivation influencing staffs decision of work(Sato *et al.*, 2017), the present study found allowance of miniature importance, however, its importance cannot be overlooked. (Ojakaa, Olango, and Jarvis, 2014) made similar findings and pointed out that salary could not be considered as an important factor to motivation.

The results further showed that 104 (63.4%) respondents showed an intention to leave their facility. Findings of (Walton-roberts *et al.*, 2017) relates to the present study by

pointing out that, health workers mostly declare their intention to leave after two years of work and also identified income, living condition, the opportunity for specialized training and professional developments as contributing factors. Singh (2016) affirmed that contextual factors such as facility amenities, living condition, as well as proximity to family relation was among factors that influence one's decision to leave. This implies that there is a need for interventions to be made concerning rural health workers with consideration to the facility of work. It is therefore critical for district, regional as well as national policymakers and implementers to re-evaluate options in regards to staff retention. Additionally, responses were solicited from 104 respondents who declared an intention to leave the facility on factors thought to influence their decision. Out of the nine-factors that were given, respondents ranked from 1 to 9, where 1 was described as the most pressing need or highest rank and 9 was the least.

The results indicated that the most pressing need to leave a facility was identified as an intention to further one's education. Followed by both intentions of a better career prospect and better education for their children and the least pressing factor was community conflict. This correlates with the results of study leave considered by 111 respondents as a form of motivation. The results further throw more light on the fact that the opportunity offered to the worker to further their education through study leave will greatly improve health workforce in the district. These findings on factor influencing workers decision to leave were also affirmed in (Walton-roberts *et al.*, 2017) and (Singh, 2016) pointing out availability of quality school for the children in rural areas as a factor in professions choice of recruitment and intention to leave among other factors such as desire to live with family member and infrastructures.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 Introduction

This final chapter presents conclusions on the main summary of the findings on the objectives outlined in the study. It also presents a concluding remark and recommendations for policy implications.

6.1. Conclusion

6.1.1 Demographic Characteristics

Majority of the respondents (59%) were females. The results also showed dominance of 99% Christians as against a handful of Muslims. Majority of the respondents were certificate holders, followed by Diploma and a few of the workers being degree and postgraduate holders. About 50% of the respondents were working at the hospital and the rest from health center and CHPS Zones. CHAG owned majority (54%) of the facilities visited as against those owned by Government and Private Institutions. The average age of the respondents was 32 years with an average period of stay of 5 years in the district. The results also showed that the period of work by a respondent was an average of 5years.

6.1.2 Staff skill mix and strength

The distribution presented shortages among the district's health workforce categories as a whole. The number of nurses, midwives, laboratory technicians, and doctors showed the major shortage of health categories which may have a substantial effect on health activities in the district. There is the need for the Ministry of Health to ensure equitable and equal distributions of health workers and work out a plan of deployment and redistribution.

6.1.3 Estimating Health Worker Density

The health worker density for the district was also presented for the years of 2016 and 2017. Though some reports have commended Ghana for some important steps taken to improve the health worker density, however, two years review of the density in the district presented no significant improvement. The density of nurses and midwife which reported of major improvement also showed results nowhere near the recommended density from WHO. The considerably high shortages of certain health workers such as doctors give a clear need for policymakers to formulate new strategies to improve health worker availability.

6.1.4 Health facilities capacity in relation to access to care.

The results for the health facilities capacity gave an account of services being provided in the district. The emphasis of maternal service has been described as salient in relation to the universal health coverage goal. The study revealed that maternal service was provided by less than half of the health centers in the district and a much fewer percentage by the CHPS zones. This may present severe repercussion for government health programs as well as donor funded programs whose major focus over the past years has been to provide 100% maternal service to all pregnant women. Again, results showed that the facilities in the district are facing issues of nonavailability of list of essential drugs, equipment and the necessary physical condition in the provision of care. The problem is more challenging with the health centers and CHPS compounds. These may have grave implication towards achieving health interventions and service utilization. There is the need for government to invest financially in the health system especially in rural health care.

6.1.5 Factors affecting health worker density

Results from the study highlighted job description, training plans, housing for personnel and condition of service to have a positive and statistically significant effect on health worker density. However, majority of respondents denoted by a 63.4% expressed intention to leave their current facility and further ranked among nine factors that may influence their intention to leave. The results showed that all the factors with the exception of community conflict were ranked as high influencing factors by at least one of the respondents. The importance of supervisory role cannot be overlooked as the study showed results suggestive of impacting health worker density. With the right strategies in factors aimed at management support, training and social amenities may increase the number of health workers as well as help retain the current staffs.

6.2. Recommendations

Government- Ministry of Health

1. Health center and CHPS zones play a major role in the provision of care in accomplishing the UHC goal, therefore government needs to put in more strategies in equipping these facilities with the adequate human resource, essential drugs, equipment, and infrastructure which are critical to achieve a sustainable health care delivery.

2. Recruitment and a three year-redistribution strategy of health professionals can be considered to adequately aid in health care delivery especially at the rural areas where there is low number of doctors and pharmacist.

3. Government needs to consider policies in upgrading health center and CHPS system. The activities of these facilities have greatly improved the health care system in the country. However, these facilities operate without pharmacy technicians, laboratory technicians and sometimes physician assistants. Government should consider

upgrading the health center to operate in such a way as to support quality health care for all.

4. Government should re-enforce polices formulated to entice health workers to rural areas as well as retain workers through compensation packages in terms of reducing study leave years and years of promotion for rural workers.

Municipal/ district Assembly

6. The district Assembly should put in measures to help address the healthcare system in the district. The only district hospital is situated in Jacobu, although, it is supposed to serve the whole district. The issue of poor road networks makes it inaccessible to the hard to reach sub-communites to enjoy the benefits of the district hospital. The remaining health facilities are forced to serve about 63.8% of the total population without doctors and a functioning laboratory.

7. The district should work diligently on social amenities that will help retain its workers such electricity and embark on periodic visit to the various facilities to pick up on strength and challenges by the District Chief Executive (DCE) and his team.

8. Support and help raise funds to help the various facilities function through acquisition of equipment and the needed drugs.

Community

9. The existing strong ties and peace within the district has helped attract and retain the district health workers. Therefore, it is the duty of the local and political authorities to ensure fostering the peace among the various communities. The study found community conflict to be the least ranked factor among the other eight variables on health worker density.

6.3. Suggestions for future work

The present study limited itself to exploring health worker density and factors influencing it. Future studies can measure the impact of health worker density on quality of care and its utilization. The study also focused on the clinical staff; doctors, nurses, midwives, biomedical scientist, laboratory technicians, pharmacist and pharmacy technicians. Further studies can focus on paramedical health staffs such as radiographers and biostatisticians. The scope of the research can also be extended to assess the impact of Human Resource Information System (HRIS) impact on Health Workforce in Ghana.

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APPENDICES

APPENDIX A

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

STUDY TITLE: HEALTH WORKERS DENSITY IN THE AMANSIE CENTRAL DISTRICT: IMPLICATION FOR THE REALISATION OF THE UNIVERSAL HEALTH COVERAGE.
TARGET GROUP: FACILITY HEADS

TARGET GROUP: HEALTH WORKERS

INTRODUCTION

My name is Debora Akua Konadu. I am gathering data on behalf of a Postgraduate Student of the Department of Health Policy, Management and Economics at the School of Public Health, Kwame Nkrumah University of Science and Technology (KNUST)) on "*Health Worker Density in the District toward realization of Universal Health Coverage in the Amansie Central District, Ghana*".

Your responses will be very helpful to improve future health development policies and programs in this district and Ghana as whole in ensuring good health and wellbeing. Kindly provide responses to the best of your knowledge and seek clarification when not clear with the options provided. Your responses will be strictly used for research purposes and will be treated as confidential.

I respect all the answers you give and appreciate your cooperation.

Thank you

QUESTIONNAIRE ID	
DATE OF INTERVIEW	
FACILITY NAME	
TELEPHONE NO	

N/B:

Introduce the process with something along the lines

"We want to understand the health needs and potentials in the district

We want to also know your wellbeing, condition of services as a health worker

We will require your internal and external health system management functions and style

Finally, we will also consider your recommendations to attract the attention of stakeholder

Set of Questions

Section 1: Demographic Characteristics

1. Sex 1. Male [ ] 2. Female [ ]
2. Age …….
3. Marital Status 1. Married [ ] 2. Single [ ] 3. Unmarried [ ]
4. Household size ……
5. Number of children below 18 years…….……
6. What is your highest qualification as a health professional in this facility? (Tick as apply)

Qualification	Tick
Certificate	
Diploma	
Degree	
Postgraduate	
International certificate	

7. Religion 1. Christianity [ ] 2. Islam [ ] 3. Others (specify)……
8. Ethnicity: 1. Akan [ ] 2. Ewe [ ] 3. Northern Region [ ] 4. Others (specify)..……..…

Section 2: Assessing the Staff Skill Mix and Strength

9. How long have you stayed in the district?……
10. How long have you also worked in the district?.....
11. How long have you worked as a health worker?.....
12. Which facility do you currently work in? 1. Government [ ] 2. Private [ ] 3. CHAG [ ] 4. NGO [ ] 5. Others (specify)…… …..
13. How long have you worked in your current facility…….
14. What is your work designation at your facility of work? (tick as applied)

1. Physician [ ] 2. Physician Assistant [ ] 3. Pharmacist [ ] 4. Pharmacy technician [ ] 5. Biomedical Scientist [ ] 6. Laboratory Technician [ ]

7. General Nurse [ ] 8. Midwife [ ] 9. Community health nurses [ ]
10. Enrolled nurse [ ]
11. Other (Specify) ……

15. What is your current grade?.....
16. How many days do you work in a month?.....
17. Number of hours you worked in a day?.....
18. Number of patients attended to in a day?.....
19. What is your break period?.....
20. How many off days do you get in a month?.....
21. How will you describe your workload? Normal [ ] Heavy [ ]
22. Is the workload evenly distributed among members of your work team? Yes [ ] No [ ]
23. Please give reason(s)…… ……
24. Are you satisfied with the match between your skills and your task? Yes [ ] No[ ]
25. Please give reason(s)…… …….

SECTION 3: Health Facility Capacity

26. What is the level of your facility? Hospital [ ] Health Center [ ] CHPS compound [ ]

27. How many functional units does your facility operate with? (tick as many applied)
    Maternity unit [ ] OPD [ ] Theatre [ ] Ward [ ] Emergency Unit [ ]
28. How many doctors do you work with?.....
29. Do you have a list of essential drugs for your facility? Yes [ ] No [ ]
30. If no, please provide reason(s) why some drugs are not available?
    Not been purchased [ ] out of stock [ ]not available at medical stores [ ]
    Others (specify)……
31. Does the health facility have a standard list of equipment that should be available in your facility according to the established norm? Yes [ ] No [ ]

32. Indicate whether the following physical and equipment's in the facility are adequate for performing the service that are expected to be provided.

33.

List of physical conditions and equipment	Yes	No	Comments/remarks
1. Lighting			
2. Sanitation Facilities			
3. Water			
4. Ventilation			
5. Cleanliness			
6. Space			
7. Storage Facility			
8. Refrigerator For Vaccines			
9. Stationaries			
10. Basic Instruments			
11. Beds			
12. Wards			
13. Linen			

SECTION 4: Factors influencing health worker density

Management support

34. Were you provided with a Job description Yes [ ] No [ ]

35. If yes, how well are you abreast with your Job description?

1. Not much [ ] 2. Somehow [ ] 3. Well-informed [ ]

36. If no, please give reason. 1. Never heard of it [ ] 2. Don't have a copy [ ]

3. Others (specify)…….

37. Have you been taken through the regulations, code of conduct of the organization, labour laws and leave policy? 1. Yes [ ] 2. No [ ]

38. If yes, how effective are these policies in your organization? 1. No enforcement [ ] 2. Little enforcement [ ] 3. Normal enforcement [ ]

4. Strict enforcement [ ]

39. Have you been taken through the task shifting policy 1. Yes [ ] 2. No [ ]

40. If yes, please state area(s) you were being trained in……

41. Are there opportunities to employ the areas you have been trained in?

1. Yes [ ] 2. No [ ]

Conditions of service and professional development

42. Have you been given a copy of the condition of service? 1. YES [ ] 2. NO[ ]
43. Are salaries in the health sector comparative to non-health sectors? YES [ ] NO[ ]
44. If no, please give reason(s)……
45. Are there regular monitoring and evaluation of your work? YES [ ] NO[ ]
46. If yes, please state the frequency? 1. Monthly [ ] 2. Quarterly [ ] 3. Yearly [ ]
    4. Others (specify)……
47. What form of evaluation is done/performed? 1 On the Job evaluation [ ]
    2 staff performance appraisal [ ]
    3. Others, please specify……
48. Do you have knowledge on Job promotion? 1. Yes [ ] 2. No[ ]
49. If yes, are promotions based on performance? 1. Yes [ ] 2. No[ ] 50. Have you attended any training within the past year? 1. Yes [ ] 2. No[ ]
51. If yes, how many times……..
52. Where was the training organized? 1. Facility Level [ ] 2. District [ ] 3. Regional [ ] 4. National [ ]
53. What is the relevance of the training on your work?.....

Motivation

54. Are accommodations provided by the facility? Yes [ ] No[ ]
55. Do you require transport to work? Yes [ ] No[ ]

If yes, how far is your residence from the facility?…….

56. Do you receive allowance in the form of motivation? Yes [ ] No[ ]
57. What do you consider as a form of motivation? Please tick as many as apply

Banks [ ] electricity [ ] portable water [ ] school for children [ ] others, please specify……

58. Do you consider paid study leave as a form of motivation? Yes [ ] No[ ]

Health workforce crisis is not only a national but also an international problem. Rural districts are particularly hard–hit by shortages of health workers in terms of the trend, mobility drivers, impact among others. Kindly respond to the following question below on health worker density in the Amansie Central District.

59. Do you have intentions to leave your current health facility?

Yes [ ] No [ ] Not sure [ ]

60. If yes, why do you intend to leave your health facility? Choose the options which is Applicable by ranking "1-9"

	Factors	**Rank**
1.	To earn a better income	
2.	Better career prospects	
3.	To further education	
4.	Child's education	
5.	Relocation of partner	
6.	Moving to a preferred location	
7.	Extended family commitments	
8.	Community conflict	
9.	Poor accommodation and infrastructure	
10.	Others (specify)	

61. which of the following reasons best describes your plan of relocation

(Please choose one which is applicable)

1. Stay within the same organization but change location [ ]
2. Change to a job outside the health sector [ ]
3. Further education [ ]
4. Travel abroad [ ]
5. Change from the GHS to CHAG [ ]
6. Change from the public health sector to the private- for-profit health sector [ ]

7. Change from the CHAG to GHS [ ]
8. Change from the CHAG to the private- for-profit health sector [ ]
9. Change to Non-governmental organization [ ]

APPENDIX B

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

STUDY TITLE: HEALTH WORKERS DENSITY IN THE AMANSIE CENTRAL DISTRICT: IMPLICATION FOR THE REALISATION OF THE UNIVERSAL HEALTH COVERAGE.

TARGET GROUP: FACILITY HEADS

INTRODUCTION

My Name is Debora Akua Konadu. I am gathering data on behalf of a Postgraduate Student of the Department of Health Policy, Management and Economics at the School of Public Health, Kwame Nkrumah University of Science and Technology (KNUST)) on "*Health Worker Density in the District toward realization of Universal Health Coverage in the Amansie Central District, Ghana*".

Your responses will be very helpful to improve future health development policies and programs in this district and Ghana as whole in ensuring good health and wellbeing. Kindly provide responses to the best of your knowledge and seek clarification when not clear with the options provided. Your responses will be strictly used for research purposes and will be treated as confidential.

I respect all the answers you give and appreciate your cooperation.

Thank you

QUESTIONNAIRE ID	
DATE OF INTERVIEW	
FACILITY NAME	
TELEPHONE NO	

N/B:

Introduce the process with something along the lines
"We want to understand the health needs and potentials in the district

We want to also know your wellbeing, condition of services as a health worker

We will require your internal and external health system management functions and style

Finally, we will also consider your recommendations to attract the attention of stakeholder

SET OF QUESTIONS

SECTION 1: DEMOGRAPHIC CHARACTERISTICS

1. Sex 1. Male [ ] 2. Female [ ]
2. Age …….
3. Marital Status 1. Married [ ] 2. Single [ ] 3. Unmarried [ ]
4. Household size ……
5. Number of children below 18 years……
6. What is your highest qualification as a health professional in this facility? (Tick as apply)

Qualification	Tick
Certificate	
Diploma	
Degree	
Postgraduate	
International certificate	

7. Religion 1. Christianity [ ] 2. Islam [ ] 3. Others (specify)……
8. Ethnicity: 1. Akan [ ] 2. Ewe [ ] 3. Northern Region [ ] 4. Others (specify)..…

SECTION 2: ASSESSING THE STAFF SKILL MIX AND STRENGTH

9. Name of Health Facility?.....
10. What is the level of your facility?.....
11. Who owns the facility?.....
12. How long have you stayed in the district?……

13. How long have you also worked in the district?.....
14. How long have you worked as a health worker?.....
15. How long have you worked in your current facility…….
16. What is your field of work at the facility? ? (tick as applicable) 1. Physician [ ] 2. Pharmacist [ ] 3. Biomedical scientist [ ] 4. General Nurse [ ] 5. Midwife [ ] 6. Community nurse [ ] 7. Enrolled nurse [ ] others, please specify……..
17. What is your current grade?.....
18. How many health workers do you currently have as staff? ……
19. Please specify Gender composition from Q18. In 2018?
    1. Male …… 2.Female……
20. How many are professionals and non-professionals?
    1. Professionals…… 2.Non-Professionals……
21. Provide the number of personnel needed according to your facility and the degree of satisfaction that you have with the numbers provided.

Post	Number of personnel at post		Number of personnel required according to the establishment		Satisfaction with the establishment				
	2016	2017	2016	2017	1	2	3	4	5
Doctors									
Physician assistants									
Pharmacist									
Pharmacy technicians									
Biomedical scientist									
Laboratory technician									
Nurses									
Midwives									

Scale; Very dissatisfied(1); Dissatisfied(2) neutral(3); satisfied(4);very satisfied(5)

SECTION 3: HEALTH FACILITY CAPACITY

22. How many functional units does your facility operate with? (tick as many as apply)

1. Maternity unit [ ] 2.OPD [ ] 3.Theatre [ ] Ward [ ] 4.Emergency Unit [ ] 5.Others, please specify…….

23. Does your facility have a list of essential drugs? 1. Yes [ ] 2.No[ ]

If no, please provide reason(s) why some drugs are not available? 1. Not been purchased [ ] 2.Out of stock [ ] 3.Not available at medical stores [ ] Others (specify)……

24. Does the facility have a standard list of equipment that should be available?
1. Yes [ ] 2. No[ ]

25. Indicate whether the following physical conditions and equipment's in the facility are adequate for performing the services that are expected to be provided.

List of physical conditions and equipment	Yes	No	Comments/remarks
1. Lighting			
2. Sanitation Facilities			
3. Water			
4. Ventilation			
5. Cleanliness			
6. Space			
7. Storage Facility			
8. Refrigerator For Vaccines			
9. Stationaries			
10. Basic Instruments			
11. Beds			
12. Wards			
13. Linen			

SECTION 4: FACTORS INFLUENCING HEALTH WORKER DENSITY

26. Indicate whether the following exist for the staff in the facility

Factors influencing health density	None(1)	Some(2)	All(3)	Comment
27. Job description				
28. Rotation system				
29. Training Plans				
30. Career plans				
31. Housing for personnel				
32. Incentives				
33. Leave policy				
34. Labor laws and code of conduct				
35. Task shifting policy				
36. Conditions of service				

37. Does the facility provide in-service training opportunities to staff? 1. Yes [ ] 2. No[ ]

38. Please state how often in a month…….?

39. Have there been any external training opportunities for staff by Government, NGOs and CSOs;

40. Please state how often in a month……?

41. Does the facility organize regular monitoring and evaluation for staffs? 1. Yes [ ] 2. No [ ]

42. If yes, please state the frequency? 1. Monthly [ ] 2.quarterly [ ] 3.yearly 4.Others,(specify)……

43. What form of evaluation is performed? 1. On the Job evaluation [ ] 2. Staff performance appraisal [ ] 3. Others, please specify……

44. What are the criteria for promotions in the facility/district? 1. Performance [ ] 2. Years of Service [ ] 3.Exceptional skills [ ] 4. Others, (Specify)……..

45. What is the number of staffs that moved out in 2016 and 2017?

2016: Male …… Female…….

2017: Male …… Female……..

46. Why do you think these people moved out of your facility?.....

47. How do you rank the listed factors? Ranking "1-9"

SN	Factors	Rank
11.	To earn a better income	
12.	Better career prospects	
13.	To further education	
14.	Child's education	
15.	Relocation of partner	
16.	Moving to a preferred location	
17.	Extended family commitments	
18.	Community conflict	
19.	Poor accommodation and infrastructure	

APPENDIX C

Participant Information Leaflet and Consent Form

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

Title of Research: Health Worker Density in deprived Amansie Central District: implication for realization of Universal Health Coverage Goal.

Name(s) and affiliation(s) of researcher(s): This study is being conducted by Miss Debora Akua Konadu. An MPH student of School Of Public Health.

Background (Please explain simply and briefly what the study is about): Assessment of the strength and availability of Health workers has recently been a major discussion for the realization of universal health coverage. Introduction of the Universal Health Coverage (UHC) concept in Ghana in 1978 necessitated the plan of dep

Purpose(s) of research: The purpose of the study is to assess health workers density and factors influencing health workforce towards achievement of universal health coverage in deprived areas of the Amansie Central District

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research: cross-sectional study design and descriptive design will be employed in the current study. quantitative design and literature review other published materials with the timeframe of 2012 to date. study will be conducted in the amansie central district.

Risk(s):

Benefit(s): The study will critically examine the influence of staff strength and quality of care; taking into consideration patient- worker ratio, capacity of health facilities and evaluating it with health care delivery, health density while exploring health system

Confidentiality: data will be kept confidential and all results will be presented in completely anonymized form. individual study numbers will be allocated. id numbers will be kept in separate file which will be called id file. data file will be kept in safe place and use
Voluntariness: Respondent can freely choose whether to be part of the study or not.research will be completely on voluntary decision.

Alternatives to participation: N/A
titution in any way.)

Withdrawal from the research: participants can redraw or choose not to answer any question which is presumed uncomfortable or private.

Consequence of Withdrawal: The study will pose no risk on participants who choose to redraw. All information obtained will be kept confidential. However such information may be used for analysis. the study will also comply with the wishes of participants.

Costs/Compensation: Participants will be given a token of compensation worth Ghc 5.00 for their time since they will not travel to participate in the study Contacts: If there are any questions concerning this study, please do not hesitate to contact Miss Debora Konadu on 0205563633. All concerns will be duly addressed.
Further, if you have any concern about the conduct of this study, your welfare or your rights as a research participant, you may contact:

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

APPENDIX D

CONSENT FORM

Statement of person obtaining informed consent:

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

DATE: _____ NAME: _____

Statement of person giving consent:

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

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

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

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

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

DATE: _____ SIGNATURE/THUMB PRINT: _____

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

I _____(Name of Witness) certify that information given to

_____ (Name of Participant), in the local language, is a true reflection of what l have read from the study Participant Information Leaflet, attached.

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

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

MOTHER'S NAME: _____

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

FATHER'S NAME: _____

APPENDIX E

THERAPEUTIC CLASS	NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS	CODE
	Hydrocortisone Tablet, 10 mg	C	NR	HYDROCTA1
	Hydrocortisone Tablet, 20 mg	SD	NR	HYDROCTA2
	Prednisolone Tablet, 5 mg	B2	R	PREDNITA1
	Promethazine Hydrochloride Elixir, 5 mg/5 ml	B1/M	R	PROHYDEL1
	Promethazine Hydrochloride Injection, 25 mg /ml	B1/M	R	PROHYDIN1
	Promethazine Hydrochloride Tablet, 25 mg	B1/M	R	PROMETTA1
5. ANTIDOTES AND OTHER SUBSTANCES USED IN POISONING				
5.1 SPECIFIC ANTIDOTES				
	Acetylcysteine Injection, 200 mg/ml	C	R	ACETYLIN1
	Activated Charcoal Powder, 50 g	A/M	R	ACTCHAPO1
	Atropine Injection, 0.6 mg/ml	B2	R	ATROPIIN1
	Benzatropine Injection, 1 mg/ml	C	R	BENZATIN1
	Diazepam Injection, 10 mg/ml	B1/M	R	DIAZEPIN1
	Flumazenil Injection, 0.2 mg	D	R	FLUMAZIN1
	Naloxone Injection, 200 microgram /ml	C	R	NALOXOIN1
	Naloxone Injection, 400 microgram /ml	C	R	NALOXOIN2
	Phytomenadione Injection, 10 mg/ml	B2/M	R	PHYTOMIN1
	Phytomenadione Tablet, 10 mg	B2	NR	PHYTOMTA1
6. ANTICONVULSANTS				
	Carbamazepine Tablet, 200 mg (Sustained-Release)	SD	R	CARBAMTA3
	Carbamazepine Tablet, 400 mg (Sustained-Release)	SD	R	CARBAMTA4
	Carbamazepine Tablet, 100 mg	C	R	CARBAMTA1
	Carbamazepine Tablet, 200 mg	C	R	CARBAMTA2
	Diazepam Injection, 5 mg/ml	B1/M	R	DIAZEPIN1
	Diazepam Rectal Tubes, 2 mg/ml	A/M	R	DIAZEPRS1
	Ethosuximide Syrup, 250 mg/ 5 ml	D	R	ETHOSUSY1
	Ethosuximide Tablet, 250 mg	D	R	ETHOSUTA1
	Magnesium Sulphate Injection, 20 %	B1/M	R	MAGSULIN1
	Magnesium Sulphate Injection, 25 %	B2/M	R	MAGSULIN2
	Magnesium Sulphate Injection, 50 %	C	R	MAGSULIN3
	Phenobarbital Injection, 200 mg/ml	B1	R	PHENOBIN1

THERAPEUTIC CLASS	NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS	CODE
	Phenytoin Injection, 50 mg/ml	D	R	PHENYTIN1
	Phenytoin Sodium Capsule, 100 mg	B2	R	PHENYTCA2
	Phenytoin Sodium Tablet, 100 mg	B2	R	PHENYTTA1
	Primidone Tablet, 250 mg	C	R	PRIMIDTA1
	Sodium Valproate Syrup, 200 mg/ 5 ml	D	R	SODVALSY1
	Sodium Valproate Capsule, 500 mg (Slow-Release)	D	R	SODVALCA2
	Sodium Valproate Capsule, 200 mg	D	R	SODVALCA1
	Sodium Valproate Tablet, 200 mg	D	R	SODVALTA1
7. ANTI-INFECTIVE DRUGS				
7.1 ANTIHELMINTHIC DRUGS				
7.1.1 Intestinal Antihelminthic Drugs				
	Albendazole Syrup, 100 mg/ 5ml	A/M	R	ALBENDSY1
	Albendazole Tablet, 200 mg	A/M	R	ALBENDTA1
	Albendazole Tablet, 400 mg	A/M	R	ALBENDTA2
	Mebendazole Tablet, 100 mg	A/M	R	MEBENDTA1
	Mebendazole Tablet, 500 mg	A/M	R	MEBENDTA2
	Niclosamide Tablet, 500 mg	B2	R	NICLOSTA1
	Tiabendazole Suspension, 50 mg/ml	B2	R	TIABENSU1
	Tiabendazole Tablet, 500 mg	B2	R	TIABENTA1
7.1.2 Antischistosomal Drugs				
	Praziquantel Tablet, 600 mg	B1	R	PRAZIQTA1
7.2 ANTIBACTERIAL DRUGS				
7.2.1 Penicillins				
	Amoxicillin + Clavulanic Acid Injection, (500 mg + 100 mg)	B2	R	COAMOXIN1
	Amoxicillin + Clavulanic Acid Suspension, (250 mg + 62 mg)	B2	R	COAMOXSU1
	Amoxicillin + Clavulanic Acid Suspension, (400 mg + 57mg)	B2	R	COAMOXSU2
	Amoxicillin + Clavulanic Acid Tablet, (250 mg + 125 mg)	B2	R	COAMOXTA2
	Amoxicillin + Clavulanic Acid Tablet, (500 mg + 125 mg)	B2	R	COAMOXTA1

THERAPEUTIC CLASS	NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS	CODE
	Rifampicin Tablet, 300 mg	PD	NR	RIFAMPTA2
	Streptomycin Sulphate Injection, 1 g	PD	NR	STREPTIN1
7.3 ANTIFUNGAL DRUGS FOR SYSTEMIC USE				
	Fluconaz ole Tablets, 50 mg	C	R	FLUCONTA1
	Griseofulvin Tablet, 125 mg	B2	R	GRISEOTA1
	Griseofulvin Tablet, 500 mg	B2	R	GRISEOTA2
	Itraconazole Tablet, 100 mg	D	R	ITRACOTA1
	Ketoconazole Tablet, 200 mg	C	R	KETOCOTA1
	Miconazole Oral Gel, 20 mg/g	C	R	MICONAOG1
	Nystatin Suspension, 100 000 IU/ml	B2	R	NYSTATSU1
	Nystatin Tablet, 100 000 IU	C	R	NYSTATTA1
	Nystatin Tablet, 500 000 IU	C	R	NYSTATTA2
	Terbinafine Hydrochloride Tablet, 250 mg	D	R	TERBINTA1
7.4 ANTIPROTOZOAL DRUGS				
7.4.1 Anti-Amoebic Drugs				
	Metronidazole Injection, 5 mg/ml	B2	R	METRONIN1
	Metronidazole Suppository, 500 mg	B2	R	METRONRE1
	Metronidazole Suspension, 100 mg/ 5ml (as benzoate)	B1/M	R	METRONSU1
	Metronidazole Suspension, 200 mg/ 5ml (as benzoate)	B1/M	R	METRONSU2
	Metronidazole Tablet, 200 mg	B1/M	R	METRONTA1
	Metronidazole Tablet, 400 mg	B1/M	R	METRONTA2
	Tinidazole Capsule, 500 mg	B2	R	TINIDACA1
7.4.2 Antimalarial Drugs				
	Artemether + Lumefantrine Dispersible Tablet, (20 mg + 120 mg) (Co-Formulated)	A/M	R	ARTLUMDT1
	Artemether + Lumefantrine Tablet, (20 mg + 120 mg) (Co-Formulated)	A/M	R	ARTLUMTA1
	Artesunate + Amodiaquine Granular Powder, (25 mg + 75 mg)	A/M	R	ARTAMOPO1
	Artesunate + Amodiaquine Tablet, (25 mg + 75 mg) (Co-Blistered)	A/M	R	ARTAMOTA2
	Artesunate + Amodiaquine Tablet, (50 mg + 150 mg) (Co-Blistered)	A/M	R	ARTAMOTA1
	Artesunate + Amodiaquine Tablet, (100 mg + 270 mg) (Fixed Dose)	A/M	R	ARTAMOTA5

APPENDIX F

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Ref: CHRPE/AP/468/18 — 23rd August, 2018.

Miss Debora Akua Kontadu
St. Peters Hospital
Post Office Box 31
JACOBU.

Dear Madam,

LETTER OF APPROVAL

Protocol Title: ***"Health Worker Density in Deprived Amansie Central District: Implication for Realization of Universal Health Coverage Goal."***

Proposed Site: ***Amansie Central District.***

Sponsor: ***Principal Investigator.***

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

The Committee reviewed the following documents:

- A notification letter of 22nd March, 2018 from the Amansie Central District Health Directorate (study site) indicating approval for the conduct of the study at the District.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 23rd August, 2018 to 22nd August, 2019 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

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

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

Yours faithfully,

Osomfo Prof. Sir J. W. Acheampong MD, FWACP
Chairman

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