WORK LOAD INDICATORS OF STAFFING NEEDS FOR MIDWIVES AND NURSES OFFERING MATERNAL NEONATAL AND CHILD HEALTH SERVICES IN CHONGWE DISTRICT LUSAKA ZAMBIA

BY

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DECLARATION

I hereby declare that this thesis herein presented for masters of science in midwifery and women's health is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that it has not been previously submitted either wholly or in part for any other degree, diploma or other qualification at this or any other university nor is it currently submitted for any other degree.

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DEDICATION

This work is dedicated to my beloved husband Charles and the Zulu Family.

ABSTRACT

Lack of appropriate human resources planning is an important factor in the inefficient use of the public health facilities. Workforce projections can be improved by using objective methods of staffing needs based on the workload and actual work undertaken by workers, a guideline developed by Peter J. Shipp in collaboration with WHO—Workload Indicators of Staffing Need (WISN).

This study was conducted in all the thirty seven facilities of Chongwe District. At each health facility, the study included Midwives and Nurses offering MNCH services only. The study used the WISN method recommended by WHO to assess the availability of Midwives and nurses offering MNCH services.

Staff levels for Midwives and Nurses offering MNCH services in Chongwe District stood at 91 which is 38.7% representation of the required number of staff needed to carry out the MNCH activities in the District. This means that the District is greater than the current workforce, with WISN ratio of 0.4.

This study showed a shortage of Midwives and Nurses offering MNCH services in all the facilities of Chongwe District, which confirms that there is considerable demand. With this in mind, rigorous cost analysis of policy options should be done by the Ministry of Finance and National Planning while bearing in mind the advantages of staffing by available workload per facility. The Nursing Officers and heads of departments should consider planning annual leave for their staff in periods when workload is low. This would entail a critical workload trends analysis per facility. Also, close supervision and job descriptions for the different cadres of nursing staff could help in reducing the inappropriate and inefficient use of staff. Finally, training of all departmental heads in the use of the WISN would certainly be beneficial to the district.

Key words: *Activity standards, staffing needs, WISN, Workload, Workforce projection*

TABLE OF CONTENTS

CHAPTER ONE - INTRODUCTION

CHAPTER TWO

CHAPTER THREE

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

DEFINITIONS OF TERMS

Nurse: A person trained to care for the sick or infirm, especially in a hospital (Oxford dictionary, 2018)

Workload   Amount of work to be done by a person in a period of time (Cambridge Dictionary, 2008).

Indicators   Specific information on the state or condition of something (Cambridge Dictionary, 2008).

Staffing   A group of persons, as employees, charged with carrying out the work of an establishment or executing some undertaking (Oxford dictionary, 2018)

Needs   Things that one must have in order to have a satisfactory life (Cambridge Dictionary, 2008).

Establishment   Number of funded positions for the Nurses and Midwives (Oxford dictionary, 2018)

Rural Health Centre A clinic located in a rural area (Oxford dictionary, 2018)

Overtime   Time spent working after the usual time needed or expected in a job (Cambridge Dictionary, 2008).

Nurse   A person trained in taking care of the sick and injured

Workload   Amount of work that nurses/midwives do

Indicators   Point out

Staffing   Employees of an organisation

Needs   Something needed

Establishment   Official number of nurses and midwives that the district is allowed to have

Rural Health Centre A health facility that is located in a rural place

Overtime   Time worked in addition to normal working hours

ABBREVIATIONS

WHO:	World Health Organization
WISN:	Workload Indicators of Staffing Need
HMIS:	Health Management Information System
HRH	Human Resource for Health
PHO:	Provincial Health Office
DHO:	District Health Office
MoH	Ministry of Health
RHC:	Rural Health Centre
RM:	Registered Midwife
RN:	Registered Nurse
UNZA	University of Zambia
MCH	Maternal and Child Health
MNCH	Maternal Neonatal and Child Health
NGO	Non-Governmental Organisation
PHC	Primary Health Care
AWT	Available working time
CAS	Category allowance standards
IAS	Individual allowance standards
ANC	Antenatal Care
FP	Family planning

CHAPTER ONE
INTRODUCTION

The WISN method is a human resource management tool that determines how many health workers of a particular type are required to cope with the workload of a given health facility. It assesses the workload pressure of the health workers in a given facility.

It is said that a "well-performing" health workforce is one that is available, competent, responsive and productive. To achieve this, actions are needed to manage dynamic labour markets that address entry into and exits from the health workforce and improve the distribution and performance of existing health workers (AHO, 2014).On the other hand Human resources are one of the central pillars for access and universal health coverage, but represent a permanent challenge for many countries globally, in view of disequilibria in their availability, composition, distribution and productivity, mainly in primary health care (Enfermagem,2014).

In view of the essential role health professionals play in the protection, promotion and restoration of populations' health, it is fundamental for quantitative and qualitative planning and investment in the development of these professionals be done cautiously so as to respond to the different and changeable health needs of the communities, efficiently and effectively (Murphy, 2009).

Dreesch, (2005), states that the planning process of health professionals looks for a balance between what is available in terms of market and what is necessary to guarantee attendance to the users' health demands. In view of this, the dimensioning of nursing professionals, who represents the largest staff contingent in all health areas, has advanced in the discussion and enhancement of methods and parameters, mainly in hospital care. Nevertheless, in the Zambian Primary Health Care context (PHC), specifically in Chongwe District, no known studies have addressed this theme. Although scientific evidence (Crisp, 2008) indicates a possible association between nursing staff density and maternal mortality, childhood mortality and immunization rates, predicting the number of professionals needed to attend to the users' needs in Chongwe District has not been done despite it recording poor health indicators in maternal mortality 23 - 63/100,000, fresh still births 30 - 31and skilled attendant at birth 44% - 50% as shown in its HIMS 2015- 2017 data base.

WHO, (2010) instituted the workload Indicators of Staffing Need (WISN) for all globally. The Chongwe District which is a rural district with poor health indicators can apply the Workload indicators to meet its staffing needs.

The WISN addresses workload by using activity (time) standards that are applicable to each workload component and to each professional's available time. This method provides the difference between the actual and calculated number of staff, which eventually shows a lack or surplus of a certain professional category (WHO, 2010).

In view of the unavailability of studies to support Nursing/Midwifery staffing in Primary Health Care, the objective of this study was to assess the workload indicators of staffing needs for Midwives and Nurses offering Maternal Neonatal and Child Health services in the health facilities of Chongwe District.

1.1 Background information

The goal of human resource management is to have the right number of people with the right skills in the right place, at the right time, with the right attitude, doing the right work at the right cost with the right work output. Globally, there is a shortage of health workers ($\geq$ 4 million) and sub-Saharan Africa (SSA) is the hardest hit (Chen et al, 2014).

This has been attributed to a variety of causes that include the following: increased workloads, increasing labour migration to high-income countries and under investment in the health sector that has adversely affected the working environment.

Traditional ways to determine staffing requirements include calculating population-to-staff ratios (for example, X number of nurses per 10 000 population) and facility-based staffing standards (for example, X number of nurses and Y number of doctors for a health Centre), (WHO, 2010). These methods have serious disadvantages. Above all, they fail to take into account both the wide local variations in the demand for services and the work that health workers actually do. Health managers need a better, systematic way to make staffing decisions, if they are to manage their valuable human resources well.

In view of the difficulty of ensuring an adequate and appropriate distribution of health services, together with increasing financial pressures in the public sector, many countries have been forced to consider using more vigorous methods for determining staffing levels in the health facilities. The Workload Indicators of Staffing Need (WISN) method is one such method.

It uses a form of activity analysis (activity standards), together with measures of utilisation and workload to determine staffing requirements. The method provides a vehicle for assessing localised staffing needs that is believable and which at the same time is sharply different to historic methods (WHO, 2010).

The conceptual approach behind WISN was described as early as 1980 (WHO, 2010). Subsequently it was developed as an operational tool in 1984 by Shipp to meet some specific requirements for a simple but rapid method for projecting staff requirements in Human Resources (HR) strategic planning. Development of the method continued with pilot applications in a number of countries and culminated with its adoption, publication and promotion by the World Health Organization in 1998 (WHO, 2010). It is intended for the wider range of managers working in today's health systems. Its preparation benefits all levels of management as the method is simple to operate as it uses already collected, available data. Also, it is simple to use, applicable to staffing decisions at all health service levels. It is technically acceptable to health service managers, it is comprehensible to non-medical managers. It is realistic, providing practical targets for budgeting and resource allocation.

The WISN method takes into account differences in services provided and in complexity of care in different facilities. The calculation of staff requirements is based on the same medical standards in all similar facilities. No special data collection exercise is required, because the WISN method uses available service statistics.

With the WISN method, two types of results, that is, differences between the actual staffing of Nurses/Midwives and the WISN staffing requirement of Nurses/Midwives (workforce gap) and ratios (workload pressure) are provided.
The difference between the actual and calculated number of health workers shows the level of staff shortage or surplus for the particular staff category (or cadre) and health facility type for which WISN have been developed. The ratio of the actual to the required number of staff is a measure of the workload pressure with which the staff is coping.

The staff requirements of individual health facilities can be added together across administrative areas to estimate staff requirements for districts, provinces and nationally. The WISN method can

be applied for government, nongovernmental organization (NGO) and private health facilities and for all personnel categories, including non-medical ones. Managers at district, provincial or national levels, as well as staff in charge of individual health facilities, can all use WISN to make better human resource decisions. The use of this method in staffing and allocation has so many benefits which include; coming up with how best to improve a facility's current staffing situation, better priorities for allocating new staff or transferring existing staff can be set if WISN is used to identify inequities in current staffing of health facilities or areas. The analysis of the workload pressure will further help managers decide which health facilities should receive the highest priority. WISN can also help managers determine the best way to allocate new functions and transfer existing functions to different health worker categories. It can be decided whether the number of existing cadres should be reduced, a new staff category created or tasks shifted between cadres. This is done by reviewing the range of functions and any possible overlap in work done by the different staff categories for which the WISN results have been calculated.

The WISN calculations are based on current professional standards for performing a particular component of work. Thus it allows managers to see in which facilities the current professional performance is low in comparison with other facilities. By using improved professional standards in the WISN calculations, managers can calculate how many extra staff will be required in a particular cadre to achieve these new standards.

A manager can use WISN to plan future staffing of health facilities. Instead of current workload data, in the WISN calculations one can use data on anticipated workloads of planned future services. This allows managers to calculate how many health workers of a particular type would be required to deliver such future services.
On the other hand, WISN can be used to examine the impact of different conditions of employment on staff requirements. They include changes in the length of the working week, increased vacation or different in-service training policies, for example.

The Global Strategy on Human Resources for Health: Workforce 2030, which was submitted to the World Health Assembly in May 2016, projects the vision to accelerate progress towards universal health coverage and the Sustainable Development Goals by ensuring universal access to

health workers. The need for an evidence-based planning method that could estimate actual health worker staffing needs in health facilities that could in turn contribute to producing and managing staff in the required numbers at the required places, is principal.

WISN carried out to assess health worker requirements in Indonesia, India, England, Thailand and the UK have illustrated staffing excesses, shortages, or adequacies.

According to Campbell, Director Health Workforce at WHO Headquarters (2016), the Road map for scaling up human resources for health for improved health service delivery in the African Region 2012–2025 lays emphasis on the availability of sufficient numbers of qualified health workers in the right place as essential for the delivery of quality health services to the population. Furthermore, he stated that there is a critical shortage of skilled health professionals (Physicians, Nurses and Midwives) in 57 countries the majority of which are in the AFRO region.

According to WHO's Human Resources for Health Observer Series No. 15 of 2016 entitled "Workload Indicators of Staffing Need (WISN): Selected Country Implementation Experiences", Majority of the health cadres in the region were working under pressure due to the shortage of health workers. This is in line with the findings of an assessment which was conducted in March, 2012 by the Namibian Government as well as in Botswana where the WISN Tool was able to reveal that nurses spent much of their time interpreting for physicians instead of carrying out the nursing care hence creating a picture that there was a shortage for the nursing staff. The same document revealed that in 2013, the Democratic Republic of Congo, with the aid of the WISN Tool, was able to come up with evidence based data as far as medical staff was concerned. This data was eventually used in the human resource forecasting for staffing and allocation.

  In September 2012, Uganda did make an assessment of health workers in its health facilities using the WISN. The results demonstrated that there was inadequate staffing of health workers especially in rural health Centers. With these findings, the government redistributed existing health workers to improve staffing equity.

Burkina Faso also has no different story as far as assessment of staff with the WISN Tool is concerned. A study conducted in two health facilities revealed a shortage of nurses and midwives in Ouagadougou while at the Kaya CHR, there was enough staff to handle the workload in the maternity ward.

The above findings in the various countries where the WISN has been used to assess Health workers may help governments to determine whether a redistribution of health human resources is warranted.

According to the Annual Health Statistical Bulletin, MoH of 2012 which was published in August 2014, there are an estimated 2,517 Midwives and 9,463 Nurses in Zambia The Bulletin further reports that out of the 6,106 approved MoH establishment for midwives, only 2773 are filled up giving a variance of 3,333 (55%). Coming to the Nurses, approved MoH establishment is 17,497. Of this, only 9,575 positions are filled giving a gap of 7,922 (45%).

These statistics show that the country has less than half the required WHO recommended Human Resource for Health (HRH) workforce. This picture can be attributed to the high staff turnover at public health facilities, especially in rural areas where there is a net negative migration, despite the annual pool of graduates from training institutions. This is attributed to dissatisfaction with compensation and non-monetary factors such as occupational hazards, physical and psychological violence, and unreasonable workloads (World Bank, 2013; WHO, 2012).

The other contributing factor is the staff recruitment at national level. Establishment shows the number of clinical and administrative positions that have been approved by Cabinet Office. However, positions in the Establishment can only be filled when Treasury Authority is granted. The funded establishment represents positions with Treasury Authority from the Ministry of Finance (MoF). Funded positions on the establishment increase depending on funds allocated in the national budget for net recruitment each year. The "gap in the Establishment" represents positions that are not funded. The approved Establishment was initially developed during the restructuring process of the MoH in 2006 and has been adjusted on an annual basis based on

approvals of structures for new health facilities. Over the years, the MoH has observed that the distribution of positions in the current establishment may not meet the requirements for effective service delivery.

Chongwe district is also not spared with the trend of Nurses and Midwives shortage. According to HMIS Data of 2017, the district has a total number of 37 facilities, of these, one is a first level hospital, eighteen are rural health centers and the remaining eighteen are Health Posts. The district's Nurse Establishment is 346 but the existing workforce is 338 with a variance of 8 (2%). This establishment has been in existence for long and so is not meeting the population changes that has taken place in the recent past. Going by the indicators of maternal newborn and child health, the district recorded maternal deaths ranging from 23 to 63/100,000 in the year 2015 to 2017. Under five mortality was at 4 to 13/1000 admissions in the same period.

The district recorded 30 fresh still births in 2015, 31 in 2016 while in 2017 it recorded 34. Coming to macerated still births, the district recorded 40, 32 and 30 in 2015, 2016 and 2017 respectively. The District also recorded a 44 - 55% skilled attendant at birth in the same period In view of the above, the study aimed at finding out the state of nurses and midwives workforce in Chongwe district and the extent of workload.

1.2 Statement of the problem

Chongwe District houses 37 health facilities which include one (1) District Hospital, eighteen (18) Rural Health Centers and eighteen (18) Health Posts. The district's establishment stands at 346 Nurses/ Midwives but currently the staffing levels are at 338. From this information, one may say the District is doing well as it stands at 97% staffing levels. But this is not the case in that this establishment has not been reviewed in a long time and Chongwe district has grown in population and demand for health services. On the other hand, Health Management Information System of 2017, reveals Poor indicators of maternal newborn and child health as shown in the table below;

TABLE 1. 1 Selected health indicators

YEAR	2015	2016	2017
Maternal Deaths	23/100,000	63/100,000	60/100,000
Fresh still births	30	31	34
Macerated still births	40	32	30
Skilled attendant at birth	44%	50%	48%

Source: Chongwe HMIS, 2017.

Going by the information provided above, one would ask, where is the Nurse /Midwife when the foetus is in distress for the district to record these high numbers of fresh still births? Why should only 44 - 50% of pregnant women be attended to by skilled birth attendants when delivering when it is required that all women should be attended to by skilled birth attendant. In the case of maternal deaths, World Health Organisation states that" no woman should die while giving birth" but the district is recording high statistics of Maternal deaths.

In view of the above, tactical information on human resources for health is needed to be provided to guide policy making. This information is what was lacking in Chongwe District and for this reason, Workload Indicators of Staffing Needs assessment using the WISN tool, which had never been done in the district needed to be computed as population ratios do not consider that workloads may differ in different localities; hospitals with the same bed capacity may not have same morbidities, health seeking habits and facility workloads. Additionally, health requirements will vary with population density, demographic and socioeconomic characteristics, morbidity and mortality, geographical features, utilization patterns, and ease of access.

In view of this statement, the study intended to find out whether the current number of midwives and nurses offering MNCH services in the District was satisfactory for the existing work load and whether work load had anything to do with the poor indicators of maternal newborn and child health.

1.3 Rationale

Most countries, both in the developing and developed world, are experiencing the burden of increasing demand for health services. Results of the health workforce forecasts undertaken by Scheffler et al 2014, using both economic and needs-based forecasting model to estimate health worker shortages (or surplus) to 2030, indicate that if no changes are made to the current trends in health worker production, the forecasts estimate significant shortages in health workforce across the globe, with low income countries facing even more severe and increasing shortages by 2030. Zambia is a low income country and so she is not spared from the forecasting made. Because of this, she must seek to meet these demands with new, more efficient and more radical approaches to health and health care provision. This must include a more effective use of its resources as it will be a major determinant of efficiency and effectiveness in the delivery of health care.

Beside the shortage of health workers, the lack of credible data hinders management/ policy makers to make evidence based policy decisions to manage their existing health workers with regards to understanding their workload and efficient deployment.

Since the launch of the computerised version of the Workload Indicators of Staffing Need (WISN) tool in 2010, many countries have implemented WISN studies in various settings to assess actual workload of their existing health workers at the health facilities, in an attempt to understand issues of real gaps in required staff, maldistribution and low performance and productivity of existing staff.

This study touched on the very element of health workforce planning and the importance of access to scientific evidence as the basis for health worker deployment plans, be it to reduce inequities in health worker distribution, to apply principles of task sharing or to ensure proper skill mix in a health care team.

Going by the findings of the assessment of WISN in the district under study, recommendations have been made to all those interested in understanding the implications of Human Resource for Health planning at national level and also to make stake holders gauge the strength of the tool and

its contribution to deployment of the workforce at various levels of the health system to achieve a more responsive and balanced distribution of staff.

More so, the findings of this research may be utilized in the fight against the poor health indicators being experienced currently in the district if incorporated in the implementation program. Conducting this study has brought about what exactly is trending in Chongwe district with regards workload indicators of staffing needs among Midwives and Nurses offering MNCH in relation to client satisfaction and Health outcome.

1.4 Research Questions

1. What are the workload indicators of staffing needs (WISN) for Nurses and Midwives in Chongwe?

1.5 General objective

The general objective of this study is to assess the workload indicators of staffing needs for nurses and midwives in the facilities of Chongwe district.

1.6 Specific Objectives

- To determine the workload indicator of staffing need (WISN) for Midwives and Nurses offering Maternal, Neonatal and Child Health services in Chongwe District.
- To determine the association between the staff workload and the Maternal, Neonatal and Child Health indicators in Chongwe District.

1.7 Variables

The variables of this study include; available working time, activity standards, annual workload, category allowance standards (CAS), individual allowance standards (IAS), Staff levels, workload pressure and Staffing requirement. Of these variables, workload was the dependent variable while the rest were independent variables.

1.7.1. Available Working Time (AWT) -this indicates the hours and days of work per week and the number of days of leave per year for each staff at the facility. It is ascertained by assessing the number of workdays per week, the number of work hours per day, the total days of annual leave per year, the total number of public holidays per year, the total number of sick days per year, the

total number of days for special no-notice leave per year, and the total number of training days per year.

AWT = A-(B+C+D+E)

Where:-

A = the number of potential working days in a year

B = the number of public holidays

C = the number of off-duty days due to annual leave

D = the number of off-duty days due to sickness

E = the number of off-duty days due to other leaves

1.7.2. Activity Standards- activity standard (AS) is also referred to as the amount of time necessary for a well-trained skilled and motivated worker to perform an activity to professional standards in a given circumstance. It indicates the benchmark performance standards for the activities of each staff type at the facility. It was used to assess the length of 'professional time' taken to execute tasks and put into perspective primary activities; and other individually and group-conducted activities. The study later used the set AS to calculate the standard workload, category allowance factor (CAF) and individual allowance factors (IAF).

(i)The standard workload was calculated using the formula; Standard workload = available Working Time. The activity standard was obtained through key informant interview with health staff of each cadre.

(ii). Category allowance factor (CAF): This was calculated by summing up the percentages of time it takes all members of the staff category to perform activities for which the annual statistics were not available known as category allowance standard (CAS). The CAF was used in subsequent variables to compute the number of staff needed.

CAF = 1

1 − ΣCAS%

(iii). IAS was obtained by calculating how much time additional activities of certain cadres require by;

  a) Writing down the number of staff who performed each activity and the time it took them
  b) Multiplying the number of staff by the time the activity required in one year
  c) Calculating the total IAS in a year by adding the results obtained in (b) above The individual allowance standards was then used to derive the individual allowance factor using the formula;

IAF = IAS

AWT

The result was also used to compute the staff requirement to cover additional activities of certain cadres and determining the additional workload of the staff in each of the facilities of Chongwe district.

1.7.3. Annual Workload - is basically the amount of work done by the midwives/Nurses in a year. The annual workload for each staff were obtained from the facilities ANC, postnatal, Family Planning and Delivery registers. These figures were used to calculate the basic and total staff requirements.

1.7.4. Workload-Based Staffing Requirements - the results obtained from the above variables were then used to compute the workload-based staffing requirements using the formula:

WISN staff requirement = _Annual workload x CAF Standard workload " + IAF

1.7.6. Workload Pressure - the workload pressure was calculated using the formula:

Workload pressure = (100- (existing/computed staff x100)

1.7.5. Staffing requirements/Gaps - the staffing gaps were established by subtracting the WISN staffing requirements from the existing staffing level.

1.8 Conceptual frame work

The conceptual framework in Figure 1.1 was based on the available workload of Midwives and Nurses offering MNCH services. The framework served as a simple model that displayed the link between available workload and the actual number of Midwives/Nurses needed in a given health facility of Chongwe district.

Equally, Hornby (2006) defines Workload as the amount of work expected to be done by someone on something in a given working time. Therefore, the available workload of the Midwives and Nurses offering MNCH services in Chongwe was viewed in terms of the available amount of work expected to be done by the Midwives/ Nurses offering MNCH services in a given working time in a given health facility.
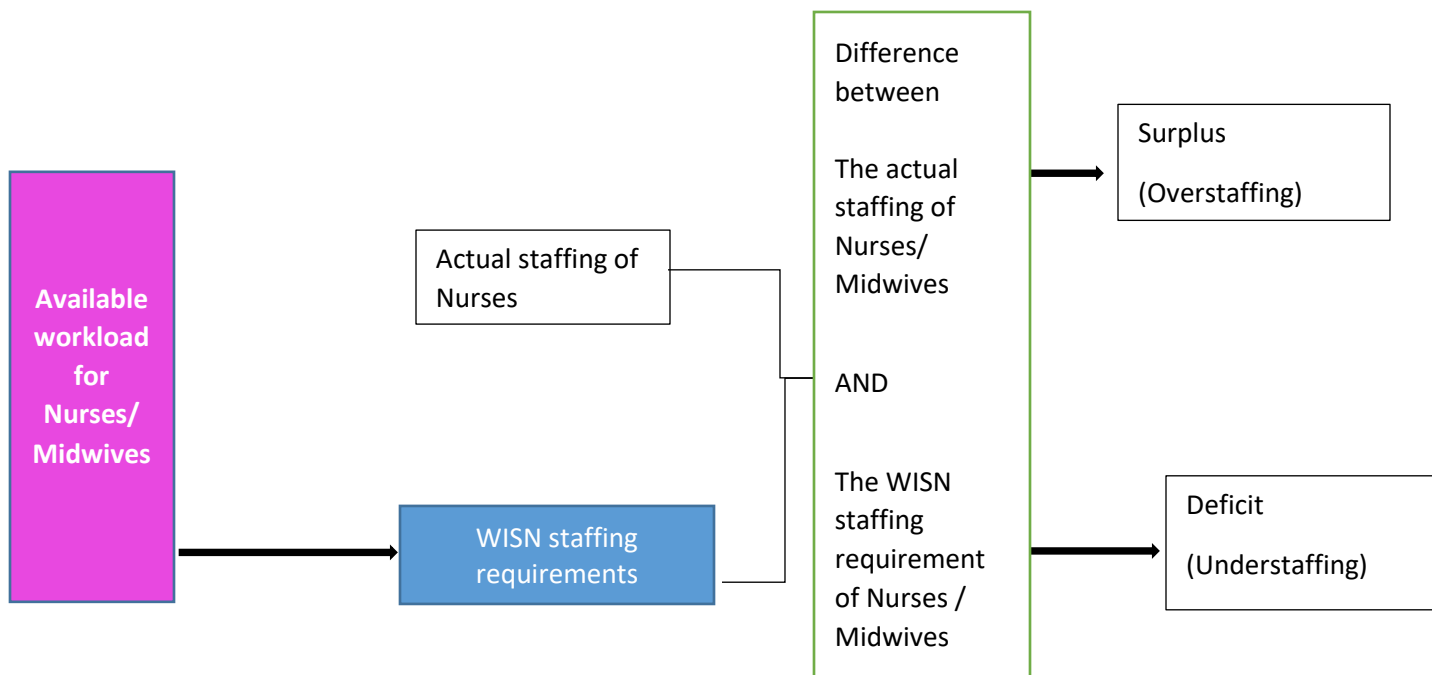
Figure 1.1 Linkage between available workload and actual number of Midwives/ Nurses offering MNCH services needed.

Source Nalere (2012)

For the sake of this study, Midwives/Nurses offering MNCH services were selected. This meant that the WISN staffing requirement of Midwives/ Nurses in a given health facility was treated as a function of the available workload of the Midwives/ Nurses offering MNCH services in the facility. However to determine whether there existed an overstaffing or and understaffing then the differences between the Actual Staffing of Midwives/Nurses and the WISN Staffing requirement were established. The linkages are shown by the arrows pointing from the available workloads of the Midwives/ Nurses to the actual number needed at the center. That's the way this conceptual framework related to this study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter consists of literature review of relevant articles, journals, books, research reports and other information sources on workload indicators of staffing needs. The aim of this review was to establish and identify available knowledge and evidence on workload indicators of staffing needs. Doing so helped the researcher explore the various ways in which institutions, governments and individuals have handled issues of workload in the Health sector in diverse parts of the world as they keep check on indicators of Maternal Newborn and Child Health.

The data search was conducted on various published and unpublished articles issued between 2013 and 2018 in relation to the topic of study using a number of databases which included MEDLINE, EMBASE, CINAHL, GOOGLE SCHOLAR, PUBMED, and HINARI. This wide search was necessary in that it helped the researcher compare what is prevailing in other parts of the world to the findings that were obtained in Chongwe. Finally a summary of the chapter was made.

2.2 An overview of the assessment of nurses and midwives staffing needs using the WISN tool.

According to Ohadi et al (2014), the workload indicators of staffing needs (WISN) process and methodology were developed over 15 years ago by the World Health Organisation as a human resource management and planning tool. It further states that WISN estimates staffing requirements by cadre in a health facility based on the actual workload for that facility and locally defined activity (time) standard. Components of the workload are the range of activities performed by a specific cadre and the workload volume is determined using facilities' annual service statistics reported through the health information system. The activity standard is the "time necessary for a well- trained, skilled and motivated worker to perform an activity to professional standards in the local circumstances". The calculated staffing requirements for each cadre are then compared with the actual staffing level in a facility. The difference between the actual and calculated number of health workers shows the level of staff shortage (deficit) surplus for a particular cadre at a facility. The WISN Ratio is calculated by dividing the actual staffing level by the required number of staff based on workload.

Many countries globally, sub-Saharan and regionally have used the WISN tool in the assessing of workload among Nurses and Midwives in order to estimate the staffing requirements.

Results have shown either a deficit or excess of Nurses and Midwives, these results have helped managers to make evidence based decisions with regards staffing and allocation of nurses and midwives. This in my view is a good thing in that it may be helping in realizing good health outcomes in the health circles.

Globally, Europe and America reveals no studies done on workload indicators of staffing needs but there is evidence that shortage of Nurses and Midwives does exist. World Health Organisation (2017), shows that there are an estimated 7.3 million Nurses and Midwives in the WHO European Region. This number is not adequate to meet current and projected future needs. Statistics show that demographic change in most countries in the region is leading to an increasing number of older people, often needing long-term care, and a decreasing number of young people who may choose a Nursing and/or Midwifery career. Nursing and Midwifery education is in strong competition with other disciplines that often offer better career prospects. Migration (mainly from Eastern to Western European countries), retirement and a trend among Nurses and Midwives to leave the professions (in search of better incomes and career opportunities) also contribute to the shortage.

Royal College of Nursing (RCN) also echoes that, staffing levels have always been an issue for healthcare staff. In the UK at present, nurse staffing levels are set locally by individual health providers. The Department of Health and professional organisations such as the RCN have recommended staffing levels for some care settings but there is currently no compliance regime or compulsion for providers to follow these when planning services. RCN understand that raising concerns can be very difficult the only thing it has done is to develop a guide to make it easier for Nurses and Midwives to assess whether a situation they are experiencing should be raised as a concern.

As a Registered Nurse or Midwife, under The Nursing and Midwifery Council (NMC) Code one has the responsibilities to act on concerns where they believe actions or situations are putting

people at potential or actual risk. The NMC has produced a publication Raising Concerns: Guidance for Nurses and Midwives (2013).

On the other hand an article in the Canberra times written by Daniel Burdon on 30th of September 2016 in Australia ,entitled **"Nurses, Midwives call for mandatory 'safe staffing' ratios",** revealed that more than 30 per cent of nurses surveyed nationally had considered leaving the profession due to high workload.

In 2016, Rev. Latino-Am. did a study on Application of the Workload Indicators of Staffing Need method to predict Nursing Human Resources at a Family Health Service in the city of São Paulo. The results showed that there was disequilibrium between the Nurse staffing needs identified through the WISN method and the existing nurse staff at the service analysed.

On the other hand in an Indonesian Province, the Midwives affirmed that the method was useful because it helped to focus their work time more clearly on key activities, besides permitting an analysis of their own work situation at the services. The WISN showed that the Midwives were spending up to 50% of their time on activities not related to the midwifery (ie geriatric care, care for tuberculosis and malaria patients etc). Hence, the initial proposal that the number of Midwives was insufficient for the category's specific workload, without the necessary clarification the WISN provides, could have resulted in an increased number of midwives instead of nurses. In my view, the findings in Indonesia province, are more explicit than Rev. Latino's who just stated that there was a disequilibrium between the nurse staffing needs and not really pointing out where the disparity lay.

Thidaporn (2016) did a study in Thailand which was looking at predicting future workforce requirements and deployment patterns enabling and sustaining universal access through different models of care. This study found negligible gaps (0.02-0.05%) between needs and availability of healthcare providers to deliver ART service.

Swapnil et al carried out an assessment of Nursing Personnel Planning for Rural Hospitals in Burdwan District, West Bengal, India, using Workload Indicators of Staffing Needs in 2012. The average WISN turned out to be 0.35 for entire district, which meant only 35% of the required nurses was available or 65% understaffed. So, there was an urgent need for more allocations and deployment of staff so that workload could be tackled and evenly distributed among all nursing personnel.

Following the above assessment, Shivam, 2014, wrote that workload is one of the most significant factors that affect the retention of nursing personnel in a service. He further went on to say that the link between nursing workloads and quality of care, including patient safety is well established. This review clearly shows that world over, there are issues with regards staffing and allocation and so, to give it a blind eye or to leave things to chance, will not help in any way hence the need for establishing exactly what is pertaining on the ground and act accordingly if health care service provision is to improve.

Regionally, Ohadi et al (2014) records that in provinces of Mozambique, the WISN was used to assess its applicability, and thus expand the use of workload measures for the decision process. As a result, based on the staffing calculation, it was concluded that all health services had a lack of general clinicians, nurses and midwives. Therefore, the activities were performed within much less time than the minimum standard required, resulting in low quality. In addition, the distribution of nurses was unbalanced in the city of Nampula, with great disequilibrium between the hospitals and the health care centers. This result does not bring out the imbalance, it would have been helpful if it was able to state where the staff was experiencing workload. For instance in the city of Nampula, how unbalanced was the staff, which region experienced much workload, was it the facilities in rural areas, urban, peri-urban or city.

In a study developed in Namibia, the WISN results also pointed out scarceness and inequality, showing that the nurses were distributed unequally among the different types of health care services and clearly deviated to the hospitals.

Hence, the authors suggest that the health services use to WISN method to estimate the health professionals required a range of needs and scenarios, including workers' adjustments in response to the implementation of new services, the decentralization or reconfiguration of primary care services.

Evidences in the literature show that the use of a tool like WISN, when adapted to the local situation, improves the distribution of staff numbers among services, permits identifying the places where there is a lack of professionals and provides information support for planning, training and allocation at local, national and regional level.

In 2013, McQuide et al of Namibia, conducted a survey on the status of health personnel in the health centers using the WISN tool. The findings highlighted health worker shortages and inequities in their distribution. Overall, staff shortages were most profound for doctors and pharmacists. Conversely the study revealed that although the country has an appropriate number of nurses, the nurse workforce is skewed towards hospitals, which are adequately or slightly overstaffed relative to nurses' workloads. Health centers and, in particular, clinics both had gaps between current and required number of nurses. Inequities in nursing staff also existed between and within regions.

In Uganda, Govule (2015) did a study on application of Workload Indicators of Staffing Needs (WISN) in determining Health Workers' Requirements for Mityana General Hospital.
The study revealed that all the cadres were experiencing additional workload due to use of their time for activities other than their primary duties. As a result, the calculated WISN staff requirements were very high compared to the existing staff levels.

Furthermore World Health Organization (2016) compiled the Workload indicators of staffing need from selected country implementation experiences which included; Botswana where it was noted that some cadres devote more of their available working time to support activities rather than their defined health service activities. For example, nurses in the outpatient department were observed interpreting for doctors; that activity could be performed by the health care auxiliaries, who are already in the system.

In Kenya, the overall purpose of the WISN study Kenya was to inform development of Human Resources for Health Norms and Standards, to be packaged in the Kenya Health Sector Strategic Plan III, and to aid redistribution of health workers as the country decentralized and restructured to comply with the 2010 constitutional requirements. Coming to Ghana, the WISN assessment revealed understaffing for most specialized nurses who are on the ground assisted by registered general nurses. In Fiji, the assessment helped in projecting the future requirements to address the issue of workforce shortages, which result in patient overcrowding in hospitals, long waiting queues for services in emergency and outpatient departments, and challenges in accessing basic health services.

Locally, according to a key informant (MOH, 2017), World Health Organisation did orient Zambia on the use of the WISN Tool but from the time this orientation was done, implementation at any level has not been done. Similarly, Chongwe has had no studies on staffing needs by the use of the WISN Tool.

2.3 Conclusion

Literature review has shown that both developing countries (e.g. Indonesia, Botswana, Ghana, Rwanda, Democratic Republic of Congo, Egypt, Fiji and Kenya) as well as developed countries, do use the WHO developed WISN tool in the assessment of workload among different health cadres. In the use of this tool, it has been revealed that there are times when there is either overstaffing or understaffing of different cadres, nurses and midwives inclusive, in the assessed facilities.

In view of the above, the study intended to carry out an assessment of workload indicators of staffing needs in Chongwe District so that the findings can be recommended to policy makers who may use them in the prudent management of human resource in the district.

CHAPTER THREE

METHODOLOGY

Dempsey & Dempsey, (2010) describes the research methodology as a method used to gather relevant information that was used to answer the research question or describe the phenomena surrounding the issue being studied. The research methodology includes the design (plan), tool used to collect data and how the data was used. It also includes the study participants and how they were selected. Ethical and cultural considerations were also included.

3.1 Study design
The study design is an overall plan that the researcher used to answer the research question as well as test the research hypothesis. The study employed a retrospective record review using available service statistics from the different public health facilities in Chongwe District and a descriptive cross sectional study design with both quantitative and qualitative approaches. It adopted the Workload Indicators of Staffing Needs (WISN) process and methods as developed by WHO (1988). According to Schurink (1998) a quantitative research such as WISN provide a step by step ways of calculating staff requirements based on workload. The calculation of the required staff size was based on the same medical standards in all similar health facilities. Differences and ratios are used in interpretations. The difference between the actual and calculated number of health personnel shows the level of staffing shortage or surplus for a particular category in a given health facility. The ratio of the actual to the required number of staff is used to measures the workload pressure with which the staff is coping.

The WISN method is based on the health personnel's workload, with activity (time) standards applied to each workload component. The choice for WISN was based on the fact that it takes into account the diverse complexities of healthcare services provided in different health facilities.

The study used available service statistics collected from the different public health facilities in

Chongwe District for the period 2015 to 2017.

WISN is one of the Human Resource Management Tools that provide systematic ways to make staffing decisions especially on health, in order to enhance proper and productive management of valuable human resources.

The WISN methodology determines the number of health cadres of a particular type that are required to cope with the workload of a given health facility. It also makes an assessment of the workload pressure of the health personnel in the same health facility. In so doing, it helps in balancing the workforce within and between health facilities by advocating for a more just distribution of workload and better productivity.

3.2 Study site and population

The study was conducted in Chongwe District of Lusaka province of Zambia. It is located 45 kilometers East of Lusaka city (CDC, 2007) and it lies approximately between longitudes 28° and 31° East and between latitude 15° and 18° South. According to Central Statistics Office (CSO) city population report of 2016, the district now covers a total surface area of approximately 2,505 square meters after the realignment. The Soli people are the inhabitants of this district though Nyanja is also a widely spoken language as the district houses other people from other parts of the country. The communities in Chongwe practice subsistence farming. They grow crops like maize, groundnuts, sweet potatoes etc. They also rear sheep, goats, pigs and a few cattle and chickens. Others are small-scale entrepreneurs.

According to CSO (2010) preliminary report, the District had a total population of 187,969 but after the realignment of the district, CSO city population report of 2016 reported a population of 100,281 Of the total population, 70,900 (50.2%) are males and 70,401(49.8%) are females. The average annual growth rate for the district is 3.2%. Of this population, 52.7% are in child bearing age while 47.3% live in the rural parts of Chongwe.

The following are the health facilities that were assessed during the study: Chongwe District Hospital, Chongwe RHC, Chainda RHC, Mutamino HP, Kanakantapa RHC, Mpango RHC, ZNS Chongwe Clinic, Shiyala HP, Kapete HP, Chalimbana RHC, Kabeleka HP, Kampekete RHC, Lwiimba RHC, Mwalumina RHC, Katoba RHC, Mikango Camp RHC, Chansu RHC Palabana RHC ZAF 71 RHC, Water Falls RHC, ZAF Base RHC, Lusaka ZASTI RHC, ZNS Airport Clinic Kasisi RHC, Kasenga HP, Chaminuka Private Clinic, Ngwerere Main RHC, Ngwerere HP, Ellensdale HP, Chikumbi HP, Mulalika HP, Nchute HP, Bimbe HP, Chilyabale RHC, Nachitete HP, Ndapula HP, Palabana Children's Village HP. These are the facilities that are housed by Chongwe district. They were all included in the study because the sample size was small.

3.3 Study population

The study population comprised of Midwives and Nurses offering MNCH services in all the health facilities of Chongwe District.

3.4 Target population

The target population for this study was Midwives and Nurses offering MNCH services.

3.5 Accessible population

The accessible population comprised of Nurses and Midwives that were offering Maternal and child Health services in Chongwe district at the time of the study.

3.6 Inclusion Criteria
- Midwives / Nurses offering Maternal Neonatal and Child Health services in the district

3.7 Exclusion Criteria

i. Nurses/Midwives offering Maternal Neonatal and Child Health services who do not consent to participate in the study
ii. Nurses/Midwives offering Maternal Neonatal and Child Health services who were doing part time.

3.8 Selection of participants

3.8.1 Sample size

A total of 37 health facilities were sampled. The study took on this number because that is the existing number of facilities that the district has and assessing all of them gave the study the power to generalize the findings. From these facilities, 37 MNCH coordinators were purposively selected and interviewed using the WISN tool. This number was arrived at, in that Chongwe district has 37 facilities and so are the coordinators who were the key informants in this study.

3.8.2 Sampling method

The district was purposively selected being a rural district, so were the respondents MNCH coordinators as key informants.

3.9 Data collection and analysis plan

Data was collected using a set of operations recommended in the WISN Tool as follows;

1. Determining priority cadre(s) and health facility type(s), in this case the Midwives/ Nurses offering MNCH services in the facilities of Chongwe district.

2. Estimating available working time for the cadre(s) by counting the number of possible working days in a year. This is done by multiplying the number of weeks in one year (52) by the number of days that a health worker in your priority staff category works in one week. The result maybe 5days a week or anything that has been calculated.

3. Defining workload components for instance Antenatal care, family planning and deliveries.

4. Setting activity standards. This is the act of determining how much working time each component identified above takes if it is to be performed well

5. Establishing standard workloads.

6. Calculating allowance factors.

7. Determining staff requirements based on WISN.

8. Analysing and interpreting WISN results.

3.9.1 Data collection technique

A set of operations were used as recommended in the WISN Tool, to calculate Nursing/Midwifery professionals in health centers of Chongwe District. The work team consisted of two pairs. The weekly workload for the team was 40 hours.

Following the steps described in the WISN method, the goal was to identify the core variables for nursing staffing.

1st Step: definition of professional category, type of health service and calculation of Available Working Time

In this study, the Nursing /Midwifery professionals from Chongwe District was analysed.

The Available Working Time (AWT) refers to how long a health professional was available, in one year, to perform his/her job, discounting established (holidays and vacation) and unexpected (medical leave and training) days of absence. It can be expressed as days or hours per year.

$TTD = [A - (B + C + D + E] \, x \, F$

Where:

AWT = available work time per professional

A = number of possible workdays in one year (obtained by multiplying the number of weeks in one year (52) by the number of workdays in one week)

B = number of days of absence due to holidays in one year

C = number of days of absence due to vacation in one year

D = number of days of absence due to medical leave in one year

E = number of days of absence due to other leaves, such as training, in one year

F = number of hours worked in one day.

2nd Step: definition of workload components

This step consists of defining the work interventions/activities that occupy most of the professionals' daily time. The most important interventions/activities on a health professional's daily agenda are considered as workload components, knowing that each component needs a specific amount of time. An example of workload component is delivery.

The workload components corresponded to the interventions/activities the Nursing/Midwifery professionals performs at the facility, described in the data collection tool and classified according to the WISN method, as follows:

1.   Health service activities – developed by all members of a professional category,   which identifies the particularity of the work and are generally registered;

2.   Support activities – complement the health activities, developed by all members of a professional category and generally are not registered;

3.   Additional activities – complement the health activities, developed by some members of a professional category and whose statistics are not registered regularly.

3rd Step: identification of mean time for workload components

Consists of the mean time needed for a trained, qualified and motivated professional to develop an intervention/activity with satisfactory competence/ skill and attitude, according to the conditions and circumstance of each service.

To identify the mean length of time the Nursing/Midwifery staff spends to execute the interventions/activities that are the workload components, the work sampling technique will be used, referring to the direct, structured, non-participatory observation of the Nurses and Midwives present at the facility, during the eight-hour workday, every ten minutes, for five days.

The interventions/activities observed was registered in the data collection tool, consisting of nursing interventions/activities that was identified and validated for the facility, work-related activities and personal activities, by three previously trained field observers.

Intervention was considered as any treatment based on judgment and clinical knowledge, performed by a health professional to improve the results obtained by the users, family and community; activity associated with activities of other professional categories, but which the health professional takes charge of and personal activity as the breaks needed in the workday to attend to the workers' physiological and personal communication needs.

The mean length of the interventions/activities was calculated per workload component. For the standard intervention/activity, that is, activities that are performed and registered routinely, the mean time was calculated based on the total time (in minutes) spent on each intervention/activity, divided by the number of users attended in the same period. In line with the WISN method, the survey of the number of users attended was based on available service statistics and reports.

For the other two workload components, support interventions/activities and additional interventions/ activities, whose statistics are not always available as they are not always registered, a mean length of time was calculated by adding up the frequencies (%) of the interventions observed plus the associated work activities, divided by the total number of observations in the period, thus adding the adjustment factor the WISN method calls: Category Allowance Standard (CAS) and Individual Allowance Standard (IAS), numerically expressed as Category Allowance Factor (CAF) and Individual Allowance Factor (IAF), respectively.

To adapt to the proposed WISN terminology, the work-related activities and personal activities that were considered in the data collection tool were considered as support activities for the category and, as they represent a significant number of hours, they were allocated proportionately among the three workload components: standard, support and additional interventions/activities.

In this step, the lengths of time can be expressed as actual work time or as a percentage of the work time.

The percentage distributions and mean lengths of the interventions found in this study will be used according to the professional category, as Nursing/Midwifery staffing parameters.

4th Step: staffing based on the method

For the purpose of staffing, the following procedure was adopted.

a) For the Health service activities: each workload component was divided by the AWT. This result shows the number of Nursing/Midwifery staff needed per category to accomplish the workload component for the Health service activities at the Facility.

b) For the support interventions/activities, the result of item a) was multiplied by the category allowance factor. This procedure revealed the number of staff needed for all Health service activities and complementary interventions/activities for the category.

c) For the additional interventions/activities, the IAF was calculated and added up to the results of items A and B. Thus,

Staff need = Health service activities $\times$ CAF + IAF

5th Step: application and interpretation of the data in accordance with the WISN method

The difference between the number of staff available at the service and the staff needed was verified by analyzing the index between these two. When bordering on one (~1), the available staff is balanced with the staff demands for the workload at the service. An index superior to one (>1) evidences too much staff in relation to the workload and inferior to one (<1) that the current staff is insufficient to cope with the workload at the health service. Therefore, the lower the index, the greater the pressure at work.

Participants were informed about the research objectives and guaranteed anonymity. Voluntary participation, signing of the Informed Consent Form (ICF), with the approval of the Research Ethics Committee were considered

3.9.2. Data management and storage

The data collecting tools did not bear any names of the respondents, but were coded for easy management. These tools were kept under lock and key. Soft copies that were generated were secured on a computer which has a pass word only known to the researcher. A backup of this information was done.

3.9.3 Data analysis plan

After finishing determining how many Nurses and Midwives are needed, based on WISN, to cope with the total workload in Chongwe health facilities, the next step was to analyse the results and consider their possible implications.

The WISN results were analysed in two ways. The first analysis looked at the difference between the current and required number of staff. The second analysis examined the ratio of these two numbers. The two analyses helped in examining different aspects of the staffing situation in the facilities.

• **Difference:** By comparing the difference between current and required staffing levels, one can identify the health facilities that are relatively understaffed or overstaffed.

• **Ratio:** By using the WISN ratio as a proxy measure, one can assess the work pressure that health workers experience in their daily work in a health facility.

The WISN ratio is calculated by dividing the current number of staff by the required number. A WISN ratio of one shows that current staffing is in balance with the staffing demands of a health facility's workload. A WISN ratio of more than one is evidence of overstaffing in relation to the workload. Conversely, a WISN ratio of less than one indicates that the current number of staff is insufficient to cope with the workload. The smaller the WISN ratio, the greater the work pressure.

3.10 Ethical considerations

The research proposal was submitted to ethics committee for approval and permission was sought from the UNZA Biomedical Research Ethics committee (Ref: 011-07-18).National Health Research Authority (NHRA) also granted authority to undertake the study. Permission was sought from Lusaka Provincial Health Office and subsequently Chongwe District Health Office to conduct the research from their health facilities. Written consent was obtained from all participants before the interview. The information that was collected was kept confidential and will not be used against them in any way. Names of respondents did not appear on any of the data collecting tools; however, the questionnaires had serial numbers for the purpose of data entry.

Actual discomforts the participants were likely to experience and how they were mitigated.

1. **Fear to give out facility statistics/ information**. To mitigate this discomfort, the researcher introduced herself, produced the school identity card and the letter of authorisation from Lusaka Province Health Office and Chongwe District Health office, UNZABREC and NHRA.
2. **Insecurity.** To mitigate this insecurity, the respondents were interviewed one at a time in a room with door closed.
3. **Psychological harm.** This was mitigated by careful considering the phrasing of questions, by debriefing sessions after the data collection is completed to permit participants to ask questions and air complaints.The participants were informed that participation in the study was purely on voluntary basis and that no invasive procedure was to be conducted on them. They were also informed that no penalties or prejudicial

treatment would be incurred to those that would not consent to take part in the study. For those that consented, they were informed that they had the right to decide at any point to terminate their participation or refuse to give information or to ask for clarification about the purpose of the study or specific questions.

3.11 Limitations of the Study

The WISN method largely depends on the accuracy of the workload records which affects the validity of the results. Some of the recorded data was inaccurate and incomplete in some health facilities. The WISN methodology also uses workload data of the previous year to calculate staffing requirements for the present year. This is a limitation in that, the findings of the study may not be what may be needed in the years to come but was what was needed during the period under study. To avoid this creating a potential source of error, WISN assessments for facilities should be conducted annually.

Another limitation was the inadequacy of data and analysis to allow segregation of Nurses and midwives. An example in point was the generalization of all nurses/ midwives (enrolled Nurses, registered Nurses, enrolled midwives Registered Midwives Direct enrolled midwives and Registered Nurse Midwives) into one category.

 Scarcity of local literature on workload indicators of staffing needs did make it difficult to fully understand the local context of the topic.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents an analysis of the empirical data for this study, which sets out to determine the number of staffing levels based on the actual staffing; and the WISN staffing requirement levels for Midwives and Nurses offering MNCH services in public health facilities in Chongwe District. This study is very essential as the district has demonstrated poor MNCH health indicators.

4.2 Data analysis

After data was collected, it was sorted out and edited for internal consistency, completeness and accuracy. The quantitative data was processed manually and entered on spread sheet then analysed using the WISN software. Data analysis consisted of the categorising, ordering, manipulating and summarising of data in order to obtain answers to the research questions.

4.3 Presentation of findings

Tables were used to present data. This method was used because it summarised the results in a meaningful way and enhance understanding of the finding to the reader. The presentation is divided into five section; Available working time, Activity standards for Nurses/ Midwives in health centers, Annual workload, Category allowance standards (CAS) and Individual allowance standards (IAS) as well as Analysis of WISN results with regards to Workload pressure, Staff levels and staffing requirement.

Table 2.1 Available working time for Nurses and Midwives in individual Health facilities

	Facility	Facility category	Available working time in hours	Available working time in days
1	NCHUTE	RHC	1,836	204
2	CHALIMBANA	RHC	1,520	190
3	CHONGWE	RHC	1,607	189
4	ZAF 71	RHC	1,480	185
5	CHAINDA	RHC	1,365	195
6	KAMPEKETE	RHC	1,519	217
7	NGWERERE	RHC	1,920	240
8	CHIKUMBI	RHC	1,778	222

9	ZNS CHONGWE	RHC	1,365	195
10	ZNS AIRPORT	RHC	1,504	188
11	KANAKANTAPA	RHC	1,764	252
12	NGWERERE	HP	1,976	247
13	ELENSDALE	HP	1,368	171
14	ZAF BASE	RHC	1,524	191
15	KAPETE	HP	1,560	195
16	KASENGA	HP	1,351	193
17	MWALUMINA	RHC	1,701	243
18	PALABANA	RHC	1,351	193
19	KATOBA	RHC	1,365	171
20	MULALIKA	RHC	1,351	193
21	WATER FALLS	RHC	1,503	189
22	MUTAMINO	HP	2,000	250
23	MPANGO	RHC	1,729	247
24	MIKANGO	RHC	1639	185
25	KABELEKA	HP	1,976	247
26	ZASTI	RHC	1,715	245
27	LWIMBA	RHC	1,480	180
28	SHIYALA	HP	1,365	195
29	KASISI	RHC	1,764	252
30	BIMBE	HP	1,274	182
31	CHILYABALE	RHC	1,960	245
32	NACHITETE	HP	1,373	193
33	NDAPULA	HP	1476	185
34	PALABANA CHILDREN'S VILLAGE	HP	1382	173
35	CHONGWE DISTRICT HOSPITAL	DISTRICT HOSPITAL	1,998	250
36	CHAMINUKA PRIVATE	HP	1484	186
37	CHANSU	HP	1368	171

Below fifty percent of the facilities 11 (29.7%) had their available working time ranging between 1,300 and 1,399 hours. Six facilities representing 16.2%, had their available working time ranging between 1,500 and 1,599 hours, another 6 (16.2%) facilities had their range between 1,700 and 1,799 hours. 5 (13.5%) facilities had available working time ranging between 1,900 and 1,999 while 4(10.8%) facilities' available working time ranged between 1,400 and 1,499. 2 (5.4%) facilities had available working time ranging between 1,600 and 1,699. Three facilities

had a 2.7% of the available time each, with one having a range of 1200 – 1299, the other a range of 1800 – 1899 and the last one having 2,000 hours in a year.

Table 3.1. Activity standards for Nurses/ Midwives in health centers

Activities	Service standards for health centers	Workload data for the most recent fiscal year
Antenatal Care (ANC) first visit	30 minutes/ANC first visit	Total ANC first visits
ANC revisit	20 minutes/ANC revisit	Total ANC revisits
Monitor and manage normal delivery	240 minutes/normal delivery	Total normal deliveries
Monitor and manage emergency delivery	180 minutes/emergency delivery	Total emergency deliveries
Immediate post-natal care of mother and baby	60 minutes/delivery	Normal
Post-natal visits	30 minutes/post-natal visit	Total post-natal visits
Growth monitoring of children	10 minutes/child	Total children growth monitored
Immunization of women of reproductive age	10 minutes per immunization	Total tetanus toxoid immunizations for women aged 15 to 49 years- all doses
Immunization of children under one year old	10 minutes/immunization	Total immunizations of under-one year-olds- all vaccines, all doses
Family planning first visit	15 minutes/FP first visit	Total FP first visits
Family planning revisit	10 minutes/FP revisit	Total FP revisits
Provide prevention of mother-to-child transmission (PMTCT) counseling and testing	10 minutes/client	Total clients who received PMTCT
SERVICE STANDARDS FOR THE DISTRICT HOSPITAL		
Antenatal care (ANC) first visit	30 minutes/ ANC first visit	Total ANC first visits
ANC revisit	20 minutes/ANC revisit	
Monitor and manage normal delivery	240 minutes/normal delivery	Total normal deliveries
Monitor and manage emergency delivery	180 minutes/emergency delivery	Total emergency deliveries
Immediate post-natal care of mother and baby	60 minutes/delivery	Normal+ forceps + vacuum + emergency deliveries + born before arrival

Activity standards for Nurses/ Midwives in the health facilities of Chongwe District is as follows 10 minutes for growth monitoring, 20- 30 minutes for ANC, Postnatal & FP and 480 minutes(8hours) for labour and delivery.
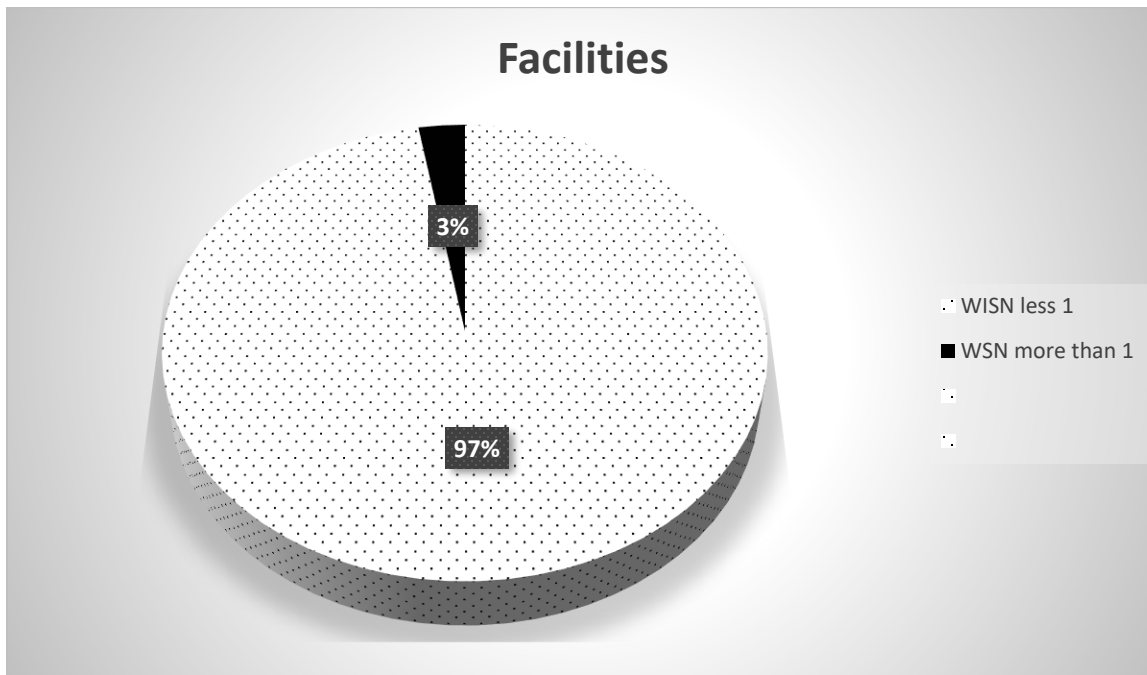
Figure 2.1 Annual workload for the District

Almost all facilities 36 (97%) in the district had an annual workload of less than 1

Table 4.1Category allowance standards (CAS) AND Individual allowance standards (IAS)

	Facility	Facility category	Total Category Allowance (%)	Total Annual Individual Allowance (in hours)
1	NCHUTE	RHC	43.5%	2,598
2	CHALIMBANA	RHC	49.1%	2728
3	CHONGWE	RHC	32.1%	565
4	ZAF 71	RHC	37.5%	1,636
5	CHAINDA	RHC	53.2%	4,676
6	KAMPEKETE	RHC	73%	3,350
7	NGWERERE	RHC	62.5%	2,036
8	CHIKUMBI	RHC	54.3%	2,786
9	ZNS CHONGWE	RHC	50.3%	4532
10	ZNS AIRPORT	RHC	36.6%	2,304
11	KANAKANTAPA	RHC	51.6%	3,269
12	NGWERERE	HP	26.1%	1,510
13	ELENSDALE	HP	38.2%	1,675
14	ZAF BASE	RHC	88.2%	2471
15	KAPETE	HP	65%	1,510
16	KASENGA	HP	39%	2,790
17	MWALUMINA	RHC	50.4%	5,078
18	PALABANA	RHC	53.3%	520
19	KATOBA	RHC	53.4%	2,210
20	MULALIKA	RHC	53.3%	2,326
21	WATER FALLS	RHC	50.2%	2,044
22	MUTAMINO	HP	30.4%	2156
23	MPANGO	RHC	51.4%	6,642
24	MIKANGO	RHC	56.7%	3,654
25	KABELEKA	HP	30.4	2156
26	ZASTI	RHC	51.4%	5,572
27	LWIMBA	RHC	61%	1,420
28	SHIYALA	HP	53.2%	5,092
29	KASISI	RHC	49%	5,052
30	BIMBE	HP	36.2%	2,598
31	CHILYABALE	RHC	40.6%	3,342
32	NACHITETE	HP	53.3%	2,326
33	NDAPULA	HP	31.5%	2,895
34	PALABANA CHILDREN'S VILLAGE	HP	56.1%	3,019
35	CHONGWE DISTRICT HOSPITAL	DISTRICT HOSPITAL	76.7%	2,798
36	CHAMINUKA PRIVATE	HP	37.1%	3,401
37	CHANSU	HP	35.6%	3,212

Majority of the facilities 15(40.5%) had their total CAS percentage falling between 50 and 59%, followed by 11 facilities representing 29.7% whose total CAS fail in the thirty percentage. The lowest CAS percentage of 20.1% was taken up by one facility so was the highest CAS of 80%. The remaining facilities had 40% CAS for 4(10.8%) facilities, 60% CAS for 3(8.1%) facilities and 70%CAS for 2 (5.4%) facilities. On the other hand, almost half of the facilities 16(43%) had their total IAS ranging between 2001and 3000 hours with two facilities having their total IAS between 500 and 1000 hours.

Table 5.1 Analysis of WISN results (Workload pressure, Staff levels, staffing requirement)

Staff category							
Serial No.	Health facility	Current number of staff	Required number based on WISN	Shortage or excess	Workforce problem	WISN ratio	Workload pressure
1	NCHUTE RHC	1	7	-6	Shortage	0.1	High
2	CHALIMBANA RHC	4	5	-1	Shortage	0.8	Fair
3	CHONGWE RHC	3	8	-5	Shortage	0.4	High
4	ZAF 71	4	5	-1	Shortage	0.8	Fair
5	CHAINDA RHC	4	13	-9	Shortage	0.3	High
6	KAMPEKETE RHC	3	13	-10	Shortage	0.2	High
7	NGWERERE RHC	4	16	-12	Shortage	0.3	High
8	CHIKUMBI RHC	1	3	-2	Shortage	0.3	High
9	ZNS CHONGWE	2	4	-2	Shortage	0.5	High
10	ZNS AIRPORT	2	5	-3	Shortage	0.5	High
11	KANAKANTAPA RHC	3	11	-8	Shortage	0.3	High
12	NGWERERE HP	1	4	-3	Shortage	0.3	High
13	ELENSDALE HP	1	2	-1	Shortage	0.5	High
14	ZAF BASE	8	5	+3	Surplus	1.6	None

15	KAPETE	1	7	-6	Shortage	0.1	High
16	KASENGA	2	3	-1	Shortage	0.7	High
17	MWALUMINA	2	3	-1	Shortage	0.7	High
18	PALABANA RHC	4	7	-3	Shortage	0.6	High
19	KATOBA RHC	1	4	-3	Shortage	0.3	High
20	MULALIKA	1	6	-5	Shortage	0.2	High
21	WATER FALLS	3	7	-4	Shortage	0.4	High
22	MUTAMINO HP	1	3	-2	Shortage	0.3	High
23	MPANGO RHC	3	8	-5	Shortage	0.4	High
24	MIKANGO RHC	3	10	-7	Shortage	0.3	High
25	KABELEKA RHC	1	3	-2	Shortage	0.3	High
26	ZASTI	2	7	-5	Shortage	0.3	High
27	LWIMBA	2	8	-6	Shortage	0.3	High
28	SHIYALA	1	6	-5	Shortage	0.2	High
29	KASISI	2	8	-6	Shortage	0.3	High
30	BIMBE	1	4	-3	Shortage	0.3	High
31	CHILYABALE	1	3	-2	Shortage	0.3	High
32	NACHITETE	1	5	-4	Shortage	0.2	High
33	NDAPULA	1	3	-2	Shortage	0.3	High
34	CHANSU	1	4	-3	Shortage	0.3	High
35	CHAMINUKA PRIVATE	1	3	-2	Shortage	0.3	High
36	PALABANA CHILDREN'S VILLAGE	1	3	-2	Shortage	0.3	High
37	CHONGWE DISTRICT HOSPITAL	14	19	-5	Shortage	0.7	Fairly high
TOTAL		91	235	Less 144	Shortage	0.4	Very High

Almost all facilities, 36 (97.2%) demonstrated shortage as a workforce problem with high workload pressure and a WISN ratio of less than 1

CHAPTER 5

DISCUSSION OF FINDINGS

5.1 Introduction

The results of this study are based on the analysis of responses from 37 key informants and retrospective document reviews of family planning, antenatal, postnatal, labour and delivery reports which was done at Chongwe District Hospital, Chongwe RHC, Chainda RHC, Mutamino HP, Kanakantapa RHC, Mpango RHC, ZNS Chongwe Clinic, Shiyala HP, Kapete HP, Chalimbana RHC, Kabeleka HP, Kampekete RHC, Lwiimba RHC, Mwalumina RHC, Katoba RHC, Mikango Camp RHC, Chansu RHC Palabana RHC, ZAF 71 RHC, Water Falls RHC, ZAF Base RHC, Lusaka ZASTI RHC, ZNS Airport Clinic, Kasisi RHC Kasenga, HP Chaminuka Private Clinic, Ngwerere Main, RHC Ngwerere HP Ellensdale HP Chikumbi HP, Mulalika, Nchute HP, Bimbe HP, Chilyabale RHC, Nachitete HP, Ndapula HP, Palabana Children's village and Chongwe District HMIS.

The discussion of findings have followed these headings:- Available working time for Nurses& Midwives in Chongwe District, Activity standards, Annual working Load

5.2 Available working time for nurses/ midwives in Chongwe district.

According to WHO, the available working time is defined as the amount of time available in a year, per staff category, for delivering health services. Available working time only takes into account an 8-hour work day. To address the 24-hour coverage provided by Nurses and Midwives in hospitals and health facilities, the study had to establish "individual allowance factors" to cover evening and night shifts. The HMIS provided annual workload data on antenatal, postnatal services, maternity services, growth monitoring and school health services. Data on current staff in the facilities were obtained from the facility key informant and validated against the Human Resource staff roll. In assembling the data, the "Midwives" category comprised all, "Midwives" included Registered, Enrolled and Certified Midwives and "Nurses" included all categories and levels.

The available working time was calculated on the basis of subtracting the non-available working time (absences) from the time available in the year. Table 1 provides details of the available working time for the Nurses and Midwives. It revealed that majority of the facilities in Chongwe

had available working time ranging between 1,300 and 1,399 hours in a year. Only one facility had available working time of 2,000. This is in line with Gouvule (2015) who calculated AWT for Uganda based on standing orders of the Ugandan Public Service. The resultant AWT for Nurses (in hours) in that study were comparable to this study's although this study was able to calculate AWT which is as high as 2000 for one facility whose staff should have taken time off for staff development activities for a minimum of 40 hours in a fiscal year to improve their knowledge and skills. The use of actual time taken to perform an activity rather than the standard time, or not including that activity because it was not done in that period may lower the total staff requirement because it will mean calculating a required staff that is necessary to continue performing in an environment which denies them the right to go for training or take days off to rest. This is in line with a study done by Mugisha at Lacor Hospital, a private hospital whose AWT were on a high side also 1884.This is because study, training days were not included in the calculation of AWT, probably because no staff had gone on training during that period, thus the higher estimate.

The 171 to 252 days available for work for nurses/ midwives are comparable to what was used in many studies. Hossain and Alam (2013) while using the WISN in Bangladesh calculated the AWT for nurses to be 205 days while Ozcan and Hornby (2014) used about 199 days in Turkey. Shipp (1998) used a range of 228-248 days while Namaganda (2014) used 246 days in Uganda. It suffices to note that AWT largely depends on the terms and conditions of work of the country and the organization under study, all of which tend to vary.

According to the terms and conditions of service for the public service, which spells out the terms and conditions of service for personnel, a permanent staff should not work for more than 40 hours a week i.e. approximately 5 days a week. Each staff is entitled to annual leave depending on his / her level. If that were to be the case then the nursing staff would be expected to work between 247-250 days a year. But there are some unavoidable circumstances like sickness and other absences that keep the staff away from work. Delanyo (2017) states that the average of 2.4 days spent on sick leave as was found in Ghana was high and is synonymous to wastage of staff time. However, this study contend that the duration and frequency of sickness absenteeism depends partly on the environment, socio-economic and technological development of a country. Hence even the 5days found in Chongwe District plus the days away due to compassionate leave and maternity leave are acceptable in the circumstances. Actually, they are far less compared to the 15 days sick leave used

by Ozcan and Hornby (2013). An average of 4 days of official absences for nurses, which include external meetings and workshops, means that substantial amount of nurses' time is spent on these activities hence diverting them from their core activities. Effort should be made not to exceed this level because in reality, it could be only a few nursing staff spending more days in workshops, leaving the rest of the work for the others. Although training provides skills, workshops have been found to provide perverse incentives in poor countries due to the generous allowances received by participants (Delanyo, 2014).

5.3 Activity standards

An activity standard is the time it would take a well-trained and motivated member of a particular staff category to perform an activity to acceptable professional standards. This study noted that it takes 30 minutes of almost all the Nurses / Midwives in the district to offer antenatal care (ANC) at first visit, 20 minutes/ANC revisit, 240 minutes to monitor and manage a normal delivery, 180 minutes to monitor and manage emergency delivery, 60 minutes per delivery to offer immediate post-natal care of mother and baby, 30 minutes/ normal post-natal visit, 10 minutes/child for growth monitoring. It also takes them 10 minutes per tetanus toxoid immunization of women of reproductive age. When it comes to immunization of children under five years old, 10 minutes is spent per child. Family planning first visit takes about 15 minutes per client while revisits takes 10 minutes. When it comes to the provision of Prevention of Mother-To-Child Transmission (PMTCT) Counseling and Testing, Nurses and Midwives take 10 minutes per client.

The district hospital does not offer routine MCH service delivery as these are done at the various rural health centres of the district. The hospital is reserved to attend to complications and if no complications, it is high cost clients. The Chongwe township populace is attended to at Chongwe Rural Health Centre. Coming to the service standards, the hospital has similar to the rest of the facilities with a difference of 10-15 minutes per activity. The hospital also has an addition activity which is instrumental delivery which takes about 60 minutes and is normally done by the medical officers. Apparently the facility has no obstetrician.

5.4 Annual workload pressure

The study customized the WISN software to the Chongwe context using the activity standards and available working time generated by the study. Using annual workload data and data on current

staffing, the WISN software generates several indicators that are vital for decision-making. The WISN difference (current staff − required staff) shows the magnitude of staffing gaps or overstaffing: a negative value signifies a shortage, and a positive value represents an excess in staffing. The WISN ratio (current/required staff), on the other hand, is an indicator of workload pressure and is key to decisions about prioritizing staffing. Using the WISN ratio, workload pressure calculations were derived using the following formula: [1 − WISN ratio] * 100. The study interpreted workload pressure according to the classification developed by investigators in Indonesia, who defined pressure as ranging from "low" (1-29%) to "high" (30-40%), "very high" (41-60%) or "extremely high" (>60%). The study revealed that Midwives and Nurses offering MNCH services in all facilities of Chongwe district are under considerable workload pressure with 13% of the facilities having a workload pressure ratio of 0.2.On the other hand, 10.5% facilities having pressure ratio of 0.1 while 31.5% facilities having a pressure ratio of 0.3. Work pressure ratio of 0.4 and 0.5 was experienced by 21% of the total facilities with each ratio taking up 10.5% of the facilities. Work pressure ratio, 0.6, 0.7 and 0.8 shared 7.9% of the total facilities each. This is in line with the findings of McQuide et al (2013).Table 4 shows that Chongwe as a district suffers a workload pressure that is very high at 60%.The table expresses existing staffing levels as a percentage of the staffing requirements ascertained by the WISN method. According to this comparison, all three types of health centres had shortages of nurses and midwives.

5.4 .1 Staff levels

Chongwe district currently has 91 staff (57 midwives and 34 general nurses offering MNCH services). According to the WISN calculation, the district needs to have 235 Midwives. This shows that the district is less 144 Nurses/ midwives, translating in to a WISN ratio of 0.4. This entails that the district has a very high workload pressure that the current staff has to deal with. From the study findings, it is clear that the staffing shortage can have an impact on care, which could result in difficulties in attending to obstetrical complications, less time to perform tasks, compromised quality of care, and delay in noticing any deviation from normal in terms of foetal wellbeing, maternal wellbeing and progress of labour. These findings are similar to the findings of Narere in Uganda, Sweeney et al in Kenya and Swaziland. This shortage may result in difficulty in reducing maternal mortality. However, at ZAF Base and ZAF 71, the supply of staff was much greater than the current workload. This is so because in as much as they are government facilities under

Chongwe district, they are directly managed by Zambia Airforce and so 99% of the staff are ZAF Officers. In view of this fact, from the WISN calculations, the facilities are not under pressure but on the ground, at certain times the facility is left with high workload as the staff working there can be called upon at any time to go and carryout military duties. In view of this the key informant indicated that it would be beneficial if the district administration would consider deploying civilian Nurses and Midwives to serve the community even when the nurses and midwives in uniform are called for military duties.

Earlier WISN studies made similar revelations elsewhere in Mozambique and Indonesia. The study by Nyamtema (2016) reveals that high workload pressure leads to poor health workers' attitude, lack of morale, absenteeism and passivity in attending to patients. High workload pressure translates to poor quality services and has negative impact on staff motivation leading to high staff-turnover which in turn widens the staff shortages according to Humphries et.al. in his study on quality of care and health professional burnout.

5.4.2 Staffing requirement

The study revealed that currently the district is operating with 91 Nurses and midwives in the delivery of Maternal and Neonatal Health services, with a WISN calculation deficit of 144, meaning that the district is operating with 38.7% of the total staff that is supposed to offer Maternal Child and Neonatal Health services. The calculated staff requirements in Chongwe District considered all the official leaves such as public holidays, trainings as provided in the public service terms and conditions of service in Zambia, because only then will they be properly motivated and empowered (with knowledge and skills) to provide quality service. But alas due to shortage, some staff were denied these rights in order to improve staff availability. If the Nurses/ midwives were to use their time mainly for the primary activities for which they were professionally trained, the total staff requirement would not be as high for some facilities. These findings were also supported by several respondents who revealed mismatch between number of clients seeking MNCH services each day and availability of midwives, yet, despite the shortage (of midwives), some midwives continued to be assigned to perform other activities despite the high workload at the facilities. These facts are similar to those of other WISN studies elsewhere in India, Kenya, Namibia, Botswana and Uganda where it was reported that if midwives were allowed to carry out duties they are trained for, the WISN calculated numbers would not sky rocket.

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5.5 Implication to the health care system

Understaffing results in exhaustion to the existing staff because they must often perform the work of two or more employees. When health workers are exhausted, productivity goes down as a result patients do not receive timely assistance and attention and so overall customer service delivery tend to suffer greatly. Also, Staff creativity and ingenuity decreases, because they are more concerned with catching up with work than thinking outside the box. On the other hand, overworking tend to result in low morale among workers and if these findings are left unchecked, it may cause nurses/midwives to take more days off duty, fail to meet deadlines and show little interest in their jobs, thus resulting into low productivity which may manifests in poor quality of health services, thus a risk to patients. Subsequently, increased workload may result in high turnover of viable health workers who may leave for greener pastures in that the demanding work environment accompanied by low pay may compel nurses and midwives to leave the health system.

5.5.1 Practice

Shortages of Nurses and midwives reduces the number of facilities equipped to offer Maternal Neonatal and Child Health as well as emergency obstetric care 24 hours a day and are significantly related to quality of care and health care outcomes such as maternal and neonatal mortality rates. Even more, the availability of skilled birth attendants is reduced particularly in rural facilities. With this, the existing workforce experiences increased workloads and job dissatisfaction as many a times have to undertake tasks for which they are not trained.

5.5.2 Administration

Managers of Health facilities should work with their superiors as well as their subordinates in the forecasting and acquisition of human resource if workloads are to be managed for the good of the communities they are serving. Leadership is very critical in staffing and health care outcomes. Through good leadership staffing can be improved by collaboration with both the government and partners that are engaged in human resource allocation for health programs.

5.5.3 Nursing education

Nursing curriculum at all levels should include Human resource for health management with emphasis on the Workload indicators of staffing needs method. A graduate with the knowledge and skill of human resource management will be better placed for management function at all levels of health care because they will know how to allocate the available resources including human resource. There is also need for continued in service training for the practicing nurses so that they also are not left behind in this critical area of under staffing in the provision of health care.

5.5.4   Nursing research

There are very few studies that have been done on work load indicators of staffing needs in Zambia. Therefore with the findings of this research, further research should be conducted in this area because as the research findings have shown, majority of the facilities are under staffed so much that the existing workforce is working under pressure. With this, studies should be done to understand client satisfaction as well as comparing maternal health outcomes for facilities manned by Midwives versus those manned by General Nurses.

5.6 Conclusion

The analysis of WISN findings demonstrates that workloads can vary widely within the same health facility type. This study revealed overall shortage of Midwives and Nurses offering MNCH services with midwives most affected. The study showed that the workload-based requirement for nurses/ midwives in the 37 facilities of Chongwe district ranges from three (3) to thirteen (13) nurses/ midwives per facility. The study further reveals much of Nurses/ Midwives' time being spent in activities other than their technical job-descriptions. It was however, difficult to apportion work pressure to specific departments since the study did not apply WISN to them. The severe staff shortage observed by this study was partly compensated by the affected cadres' working for longer hours than stipulated in the Zambia Public Service Standing Orders and this could have compromised quality of health care. This method (WISN) estimates staffing requirements based on actual service provision. Stakeholders facing human resource challenges and scarcity can employ it in prioritizing health cadres for recruitment and deployment based on existing work pressure.

5.7 Recommendations

1. Rigorous cost analysis of policy options should be done by Ministry of Finance and National Planning

2. The Nursing Officers and heads of departments should be advised to consider planning annual leave to their staff in periods when workload is low. This would entail a critical workload trends analysis per facility.

3. Close supervision and job descriptions for the different cadres of nursing staff could help in reducing the inappropriate and inefficient use of staff by Ministry of Health.

4. Training of all departmental heads in the use of the WISN would certainly be beneficial to the district by Ministry of Health.

5.8 Dissemination of findings

The study findings will be disseminated by printing and binding four (4) research project result. One copy of the research findings will go to the UNZA School of Nursing Sciences, one to the Medical Library for reference, another copy will be sent to the sponsors and the other copy to the investigator. Executive summaries will be given to Lusaka Provincial Health Office, Chongwe District Health Office and National Health Research Authority. Publication will also be done with local and international online journals.

5.10 Suggested Research Areas

Carry out a more qualitative study to get a deeper understanding of the effect of workload on client satisfaction in the district.

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Appendix 1. Information Sheet

University of Zambia

School of Nursing Sciences

Box 50110

LUSAKA.

Study Title: Workload indicators of staffing needs (WISN) for nurses and midwives in Chongwe district of Zambia.

Dear participant,

I am a student in the School of Nursing Sciences at the University of Zambia. I am conducting this study in partial fulfillment of the qualification of Master of Science in Midwifery and women's Health.

Purpose of the study

1. To assess the workload indicator of staffing need (WISN) for Nurses and Midwives in Chongwe District.
2. To determine whether the current indicators in MCH are associated with staff workload.

Procedure

I therefore ask you to participate in this study. Your duty as a respondent is to answer the questions in order to help in staffing and allocation for Nurses and Midwives in the Health facilities. Your decision to take part in this study is your choice and shall be respected.

Risks / Discomforts:

There will be no physical risks involved in this study. You may also feel uncomfortable answering some of the questions. You may refuse to answer any questions that you do not want to answer or questions that make you feel uncomfortable. You may stop being part of the study at any time. Your responses or participation in this study will not affect you in any way.

Benefits: There is no direct benefit to you personally for participating in this study. Being in this study may not change the way you work in your facility but the results from this study may help in staffing and allocation of Nurses and Midwives in Health facilities.

Alternatives to Participation: You can either choose to be in the study or not. If you choose to be in the study you do not have to stay in the study until it ends. You can decide to leave the study at any time. Your leaving will not affect you or any other privileges that you enjoy now.

Confidentiality: You are invited to take part in this study. If you agree to be in the study, you will be asked some questions on Staffing, allocation and workload. In order to uphold confidentiality, your name will not be used on any survey forms. Once we are finished with the study, information collected will be destroyed.

Voluntariness: Your taking part in this study is completely voluntary. You are free to withdraw at any time, for any reason. In the event that you decide to withdraw from the study, the information you have already provided will be kept in a confidential manner. It will not be shared with anyone else to personally harm or affect you. This will not in any way affect you or your taking part in future or any other privileges.

Re-Imbursement: There is no financial re-imbursement for participating in this study.

Contact: If you want to talk to anyone about this study because you think you have not been fairly treated, or you have any other questions about the study, you should call the Investigator of the study on 0966683140 or call the University of Zambia, School of Nursing Sciences on +260 211 252641.

Principal Investigator,
Brenda Zulu.

Appendix 2. Consent Form.

The purpose of this study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study. I further understand that if I agree to take part in this study, I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary and I can also skip questions that may deem personal or otherwise.

What does your signature (or thumbprint/mark) on this consent form mean?

Your signature (or thumbprint/mark) on this form means:

- You have been informed about this study's purpose, procedures, possible benefits and risks.
- You have been given the chance to ask questions before you sign.

You have voluntarily agreed to be in this study

I …………………………………………………………………….. (Names) Agree to take part in this study.

Signed ………………………………….. Date……………………… (Participant)

Participant's signature or thumb print.

Signed…………………………………… Date………………………. (Witness)

Signed…………………………………… Date ……………………… (Researcher)
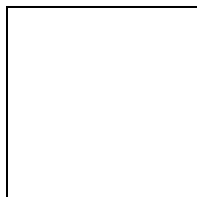
The participant to mark a "left thumb impression" in this box if   the participant is unable to provide a signature above

Persons to contact for problems or questions

1. Brenda Zulu, University of Zambia, School of Nursing Sciences, P. O Box 50110, Lusaka. Cell: 0966683140

2. Mr. Yolan Banda (Supervisor), University of Zambia, School of Nursing Sciences, P. O Box 50110, Lusaka.

 3.   The Chairman, University of Zambia Biomedical Research Ethics Committee (UNZABREC), University of Zambia, P.o Box 50110, Lusaka.

3. DATA COLLECTING TOOLS

Appendix: 3.1 Priority health worker categories and health facility types

ADMINISTRATIVE AREA			
Health facility type	Work unit	Staff category	Staffing problems (current and likely in future)
	Antenatal	Midwife	
		Nurse	
		Other	
	Delivery Suit	Midwife	
		Nurse	
		Other	
	Post-natal	Midwife	
		Nurse	
		other	
Highest priority for WISN			
Second highest priority for WISN			

Appendix: 3.2 possible annual working days

Staff category	Weeks in one year	Working days in one week	Possible working days in one year
Nurses			
Midwives			

Appendix: 3.4 Days not worked in a year

	DAYS ABSENT	
REASON FOR ABSENCE	**NURSES**	**MIDWIVES**
PUBLIC HOLIDAY		
ANNUAL LEAVE		
SICK LEAVE		
OTHER LEAVE(TRAINING, PERSONAL)		
TOTAL ANNUAL DAYS ABSCENT		

Appendix: 3.5 Workload components

WORKLOAD GROUP	WORKLOAD COMPONENT
HEALTH SERVICE ACTIVITIES OF ALL MIDWIVES	ANTENATAL CARE
	POSTNATAL CARE
	DELIVERIES
	FAMILY PLANNING
SUPPORT ACTIVITIES OF ALL MIDWIVES	RECORDING AND REPORTING
	MEETINGS
	HOME VISITING
ADDITIONAL ACTIVITIES OF CERTAIN MIDWIVES	SUPERVISION OF STUDENTS
	ATTENDING CONTINUING EDUCATION SESSION
	GENERAL ADMINISTRATION

Appendix: 3.6 Service standards

HEALTH SERVICE ACTIVITY	UNIT TIME/ RATE OF WORKING
ANTENATAL CARE	
POPSTNATAL CARE	
DELIVERIES	
FAMILY PLANNING	

Appendix: 3.7 Category allowance standards

Average available working hours in a day=			
Available working days in a week =			
Available working hours in a week =			
Available working days in a year =			
Available working hours in a year =			
Workload	Workload component	CAS (actual working time)	CAS% (percentage working time)

Appendix: 3.8 Individual allowance standards

workload group	Work load components	Number of staff performing the work	IAS(Actual working time per person)	Annual IAS(for all staff performing activity)
Additional activities of certain cadre members				
	Total IAS in a year			

Appendix: 3.9 Standard workloads

AWT in a year		
Health service activity	Unit time or rate of working	Standard workload

Appendix: 3.10 Staff requirements, based on WISN

STAFF CATEGORY				
AWT				
Health services activities of all cadres members	Workload component	Annual workload	Standard workload	Required number of staff members
A.Total required staff for health service activity				
Support activities of all cadre members	Workload component	CAS(actual working time)		CAS(percentage working time)
Total CAS percentage				
B. Category allowance factor:{1/[1-(total CAS percentage/100)]}				
Additional activities of certain cadre members	Workload components	Number of staff members performing the work	IAS (actual working time per person)	Annual IAS(for all staff performing activity)
Total IAS in a year				
C. Individual allowance factor (Annual Total IAS/ AWT)				
Total required number of staff based on WISN: (A×B+C)				

Appendix: 3.11 Analysis of WISN results

Staff category						
Health facility	Current number of staff	Required number based on WISN	Shortage or excess	Workforce problem	WISN ratio	Workload pressure

Appendix: 3.12 converting actual working time to percentage of available working time

Time unit	Conversion to percentage
Minutes per day	[(actual working time in minutes divided by 60) divided by average available working hours in a day]
Minutes per week	[actual working time in minutes divided by (average available working hours in a day times working days in a week times 60)] times 100
Hours per day	(actual working time in hours divided by average available working hours in a day) times 100
Hours per week	(actual working time in hours divided by available working hours in a week) times 100
Hours per month	[actual working time in hours divided by (available working hours in a year divided by 12)] times 100
Days per week	(actual working time in days divided by available working days in a week) times100
Days per month	[actual working time in days divided by (available working days in a year divided by 12)] times 100
Days per year	(Actual working time in days divided by available working days in a year) times 100

THE UNIVERSITY OF ZAMBIA
SCHOOL OF NURSING SCIENCES

Telephone: 252641
Telegrams: **UNZA**, Lusaka
UNALUZA 44370

P.O Box 50110
Lusaka

4th May, 2017.

The Medical Director,
Chongwe District Hospital,
Chongwe.

Dear Sir/Madam,

RE: PERMISSION TO COLLECT INFORMATION FOR RESEARCH PROPOSAL DEVELOPMENT – BRENDA ZULU (2016144826)

Brenda Zulu is currently a student pursuing Master of Science in Midwifery and Women's Health at the University of Zambia, School of Nursing Sciences.

The student is required to carry out a research study in partial fulfilment for the masters degree. Her research title is, **"Assessing Work Load Indicators of Staffing Needs among Midwives in Chongwe District"**

The purpose of writing is to request your office to allow the student to collect information at your institution which she will need to compile her Research proposal.

Your support is highly appreciated.

Yours faithfully,

Athila for

Dr. M. Maimbolowa *PhD*
SENIOR LECTURER/RESEARCH SUPERVISOR

Cc: Assistant Dean Postgraduate, School of Nursing Sciences

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

In reply plea...

File No. ......

PROVINCIAL MEDIC...
P. O. BOX 32573
LUSAKA

6th July, 2017.

Brenda Zulu (20161448260)
University of Zambia
School of Nursing Sciences.
Lusaka

**RE: REQUEST FOR AUTHORITY TO COLLECT INFORMATION FOR
RESEARCH PROPOSAL DEVELOPMENT.**

Refer to the above subject matter.

The Provincial Health Office has granted you permission to collect information
for research proposal development on the research title "**Assessing Work Load
Indicators of Staffing Needs among Midwives in Chongwe district**".

By this letter the District Health Director Chongwe is advised to accord her the
necessary assistance that she may need and ensure that the research findings
are shared with the district and the province.

Dr. Laston Chikoya
**AG/PROVINCIAL HEALTH DIRECTOR
LUSAKA PROVINCE**

cc. **District Health Director - Chongwe District**

63

C/O Maj C Tembo,

Maina Soko Military Hospital,

PO Box 320091,

Lusaka.

06 July, 2018.

The Chairperson,

UNZABREC,

P.O Box 50110,

Lusaka.

Dear Sir/Madam,

<div align="center">RE: Permission to conduct Research</div>

Iam a Master student pursuing Midwifery and women's Health at the University of Zambia. Iam asking for permission to conduct research on Workload Indicators of Staffing Needs among Nurses and Midwives in Chongwe District.

This is in view of the Poor indicators of maternal newborn and child health being exhibited in the district. The other reason is that Workload Indicators of Staffing Needs have never been assessed in the district hence lacking information to forecast the number of Nurses/Midwives required.

On the other hand, the Findings of this study may be utilised in the fight against the poor health indicators being experienced currently in the district. It may also help in reducing workload among nurses and midwives in facilities that are short staffed and management deploys as required.

Doing so may result in improved health service delivery to the community from the highly motivated health care team.

Your positive response in this subject matter will be highly appreciated.

Yours Faithfully

Brenda Zulu

THE UNIVERSITY OF ZAMBIA
BIOMEDICAL RESEARCH ETHICS COMMITTEE
Telephone: 260-1-256067 Ridgeway Campus
Telegrams: UNZA, LUSAKA P.O. Box 50110
Telex: UNZALU ZA 44370 Lusaka, Zambia
Fax: + 260-1-250753
E-mail: unzarec@unza.zm
Assurance No. FWA00000338
IRB00001131 of IORG0000774
28th September, 2018.
Ref: 011-07-18
Ms. Brenda Zulu
C/O MAJ Charles Tembo,
Maina Soko Military Hospital,
Lusaka.
RE: "WORKLOAD INDICATORS OF STAFFING NEEDS (WISN) FOR NURSES AND MIDWIVES IN CHONGWE DISTRICT OF ZAMBIA" (REF. NO. 011-07-18)
The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee (UNZABREC) on 26th September, 2018. The proposal is approved. The approval is based on the following documents that were submitted for review:

a) **Study proposal**

b) **Questionnaires**

c) **Participant Consent Form**

APPROVAL NUMBER : REF. 011-07-18
This number should be used on all correspondence, consent forms and documents as appropriate.
- **APPROVAL DATE : 26th September, 2018**
- TYPE OF APPROVAL : Standard
- **EXPIRATION DATE OF APPROVAL : 25th September, 2019**

After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the UNZABREC Offices should be submitted one month before the expiration date for continuing review.

- **SERIOUS ADVERSE EVENT REPORTING**: All SAEs and any other serious challenges/problems having to do with participant welfare, participant safety and study integrity must be reported to UNZABREC within 3 working days using standard forms obtainable from UNZABREC.
- **MODIFICATIONS**: Prior UNZABREC approval using standard forms obtainable from the UNZABREC Offices is required before implementing any changes in the Protocol (including changes in the consent documents).
- **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the UNZABREC using standard forms obtainable from the UNZABREC Offices.
- **NHRA:** Where appropriate, apply in writing to the National Heath Research Authority for permission before you embark on the study.
- **QUESTIONS**: Please contact the UNZABREC on Telephone No.256067 or by e-mail on unzarec@unza.zm.

Other
- Please be reminded to send in copies of your research findings/results for our records. You're also required to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.

Yours sincerely,
Dr. S.H Nzala
VICE-CHAIRPERSON

Tel: +260 211 252453
Fax: +260 211 252453
Website: www.unza.zm
Email: dean-nursingscience@unza.zm

School of Nursing Sciences Buidling
University Teaching Hospitals
P.O Box 50110
Lusaka, Zambia

1st October, 2018.

The Director
National Health Research Authority
Lusaka.

Dear Sir/Madam,

RE: REQUEST FOR PERMISSION TO COLLECT DATA, A RESEARCH STUDY
        ZULU BRENDA (2016144826) UNZABREC REF No 011-07-18

Zulu Brenda is currently a student pursuing a Master of Science in Midwifery
Programme at the University of Zambia, School of Nursing Sciences. Shee is required to carry
out a research study in partial fulfilment of the programme. Her research title is **"Work Load
Indicators of Staffing needs (WISN) for Nurses and Midwives in Chongwe District of
Zambia".**

The purpose of writing this letter is to request your office to allow the student to collect data.

Your support is highly appreciated.

Yours faithfully,

Mr. Yolan Banda
LECTURER/RESEARCH SUPERVISOR

Cc: Dean, School of Nursing Sciences
        Assistant Dean (PG), School of Nursing Sciences
        File

THE NATIONAL HEALTH RESEARCH AUTHORITY
Paediatric Centre of Excellence
University Teaching Hospital
P.O. Box 30075
LUSAKA
Telephone: +260 211 250309 | **Mobile:** +260 95 5632726
Email: znhrasec@gmail.com | **Website: www.nhra.org.zm**

23rd October, 2018.

The Principal Investigator
Ms. Brenda Zulu
University of Zambia
School of Nursing Sciences,
P.O. Box 50110,
LUSAKA

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"Workload indicators of staffing needs (WISN) for nurses and Midwives in Chongwe District of Zambia".**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

Dr. Godfrey Biemba
Director/CEO
National Health Research Authority

All correspondences should be addressed to the Director/CEO National Health Research Authority

67