ATTRACTING LOW LEVEL TRAINED HEALTH WORKERS IN THE RURAL AREAS: INSIGHTS FROM DISCRETE CHOICE EXPERIMENT

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A Dissertation Submitted in Partial Fulfillment of the Requirement for the Award of Masters of Public Health (MPH) degree of the Muhimbili University of Health and Allied Sciences

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October 2012

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences dissertation entitled: "Attracting Low Level Trained Health Workers in the Rural Areas: Insightfrom Discrete Choice Experiment" in partial fulfillment of degree of Masters of Public Health (MPH)

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SUPERVISOR

Date_____

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I, Tumaini N. Mikindo, do solemnly declare that, the work presented in this dissertation is my own original work, and that it has never been submitted for any degree in any other university.

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DEDICATION

To my Family,

With Love

ABSTRACT

Background:

One of the biggest challenges that policy makers face in the health sector in Tanzania is how to attract qualified human resources to the rural and remote parts of Tanzania. Currently the government has been able to only employ 35% of needed work force. The distribution of the employed health workers is characterized by geographical imbalance, attributed by reluctance to work in remote and rural. In addressing the gap, the government has increased training of lower carder health workers. However, less is known on how the newly trained lower carders would respond to known job attributes(incentiveswhile eliciting choices for particular place; particularly their attraction to rural and remote areas.

Objective:

To determine the important financial and non-financial incentives that would attract low level trained health workers to work in rural and remote areas.

Methodology:

A cross sectional explorative study using experimental economics design of discrete choices was conducted among 195 Low level final year students at Musoma Clinical Assistants School, Tarime and Geita Nursing Schools. The study investigated the incentive (attributes) package that attracts low level trained health workers in rural areas. A multivariate binary logit model was used to estimate the extent to which Low level trained health workers were willing to tradeoff between the five job attributes (net monthly pay, provision of basic housing, opportunities to upgrade their qualifications, availability of medicines and other supplies and good leadership and management) and the selection of either rural or urban job.

Results:

Most Low Level Trained Health workers' were willing to tradeoff job attributes in favor of provision of upgrading training in exchange of a rural job, OR=0.83(0.7- 11), with P value =0.037, had statistically significant influence on Low Level trained health workers' preferences. Further analysis of sub-groups showed almost similar results, with significantly influencing selection of rural jobs by students who resides in rural areas. Ranking of the attributes by using simple ordering and the DCE models, ware not statistically different, P-values = 1.573.

Conclusions:

Provision of upgrading training is more likely to attract to Low Level health workers to work in rural areas. However combining provision of training with increase in net monthly pay and/ or availability of medicines can enhance the chances of low level health workers tochoose a rural job.

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ACRONYMS

AIDS	Acquired Immunodeficiency Virus
AMO	Assistant Medical Officer
CO	Clinical Officer
DCE	Discreet Choice Experiment
DSM	Dar es Salaam
HR	Human Resources
HRH	Human Resources for Health
PI	Principal Investigator
MMAM	Mpango wa Maendeleo ya Afya ya Msingi
MoHSW	Ministry of Health and Social Welfare
TDHS	Tanzania Demographic Health Survey
USDHHS	United States Demographic Health Survey

OPERATION DEFINITION

Low Level Trained Health Worker

This refers to group of carders, namely Clinical Assistants, Enrolled Nurses, Laboratory Assistants and Pharmaceutical Assistants. They are trained for two years in Clinical Medicines, general nursing studies, Laboratory sciences and pharmaceutical sciences and upon successful completion they are awarded certificate in their respective file. However for the purpose of this study, we will only concentrate on Clinical Assistants and Enrolled Nurses.

Clinical Assistants

This refers to a two years graduate certificate in clinical medicines. The course is accredited by National Council for Technical Education.

Clinical Officer

This refers to a three years graduate diploma in clinical medicine. The course is accredited by National Council for Technical Education.

Experiment

Is a methodical trial and error procedure carried out with the goal of verifying, falsifying, or establishing the validity of a hypothesis. Experiments provide insight into cause-and-effect by demonstrating what outcome occurs when a particular factor is manipulated. Experiments vary greatly in their goal and scale, but always rely on repeatable procedure and logical analysis of the results. Also, an experiments can vary from personal and informal (e.g. tasting a range of chocolates to find a favorite), to highly controlled (e.g. tests requiring complex apparatus overseen by many scientists hoping to discover information about subatomic particles). Uses of experiments vary considerably between the natural and social sciences.

Discrete Choice Experiment

This is an econometrical model; with its theoretical foundation in random utility theory and relies on the assumptions of economic rationality and utility maximization. In stating a preference the individual is assumed to choose the alternative that yields his/her highest individual benefit, known as utility. Moreover, the utility yielded by an alternative is assumed to depend on the utilities associated with its composing attributes and attribute levels

Enrolled Nurse

This refers to a two year graduate certificate in clinical medicines. The course is accredited by National Council for Technical Education.

Human Resources

Refers to set of individuals who make up the workforce of an organisation, business, business sector, or an economy. “Human capital" is sometimes used synonymously with human resources, although human capital typically refers to a more narrow view; i.e., the knowledge the individuals embody and can contribute to an organization. Likewise, other terms sometimes used include "manpower", "talent", "labor" or simply "people".

Human Resources for Health (HRH)

Is defined as “all people engaged in actions whose primary intent is to enhance health”, according to the World Health Organization’s *World Health Report 2006,* Human resources for health are identified as one of the core building blocks of a health system They include physicians, nurses, midwives, dentists , pharmacists, social health workers as well as health management and support personnel.

Motivation

Motivation has been referred to as psychological/ biological needs and wants, including integral forces that arouse, direct, and integrate a person’s behavior and activity. Thus it can be defined as the willingness to exert and maintain an effort towards organizational goals.

Rural Area

For the purposes of this study, it includes all localities within Tanzania that are beyond the perimeter of district headquarters, within a district.

Incentives

Defined as means applied with the intention to influence willingness of employee to work towards a particular goal. it can be categorized based on the form of which is given to the intended recipient, being financial or non-financial, or the results is expected out of it; where it can be positive or negative (as in disincentive).

Financial incentives

Involve the transfer of monetary values, such as Wages/ salaries, pensions, bonuses, allowances, loans, etc.

Non-monetary incentives

Are those incentives that in the short-term involve no transfers of monetary values to or from an individual or group.

CHAPTER ONE

1 INTRODUCTION

1.1 ***Background***

Recently, the problems affecting the Human Resources for Health at a global level and in resourced constrained countries have been increasingly recognized by the international community and by national governments. Human resources for health include all persons engaged in promoting and maintaining health, from persons who support those with disease to professions that provide care. The human resources problem in health is not new, but from recent studies, it becomes clear that the problems are becoming acute (Lehmann and Sanders, 2004; MoHSW, 2009; Schrecker and Labonte, 2004).

The availability of qualified Human Resources for Health (HRH) is key determining factor for the country's health care system to provide quantity and quality health care and meeting challenges, such as targets as identified in the Millennium Development Goals (MDGs) and National priorities(Dovlo, 2003). As the governments work towards tackling different global and local health challenges, and stretching resources towards achieving internationally agreed commitments, there is growing realization that health system performance is inextricably bound to the dedication and skill of workers that the system is able to attract and retain. Thus, having right combination of health work force, both in terms of skills and numbers in the right places and sufficiently motivated to deliver quality services is key for successful initiatives that aim to tackle health problems (Yumkella, 2005).

Nearly all developing countries (especially the Sub-Saharan African) face the multi-faceted problems of health workforce shortage linked to:

i. Failure to attract qualified staff in the rural and hard to reach areas, leading to rural/urban imbalance. For instance, in Tanzania, Dar-es-Salaam alone has nearly 30 times as many medical officers and medical specialists as compared to other rural part of the country (Kurowski and Dominick, 2005).Only about 5 of Uganda's 100 or so surgeons work outside of urban areas (Chen et al, 2004; Wyss, 2004).

ii. High attrition in the form of:resignation before retirement (Standing and Baume, 2000); Change of occupation of the trained health workers (WHO, 2006; Butchan and Calman, 2004); sickness and death (Harries et al, 2002; Narasimhan, et al, 2004).

iii. Insufficient training opportunities, as result of few colleges and low capacity of training colleges in terms of space and tutors (Dovlo, 2003). E.g. Two-thirds of sub-Saharan African countries have only one medical school and eleven sub-Saharan countries have no medical schools at all (USAID 2006).

In addition to aggregate shortage, in most countries there is significant imbalance between staffing level in urban and rural settings, which impacts on the equity of access to quality services; putting rural inhabitants – often the poorest section of society - at even greater disadvantage than their urban country men and women. Health workers are attracted to urban areas by better living conditions, schooling for their children and often the ability to

substantially increase their incomes through the practicing in the other clinics after their official hours (Ferrinho et al, 1998).

In order to understand recruitment and retention, different methods have been employed by experts, such as; attrition rate, vacancy rates and Stability index.

i. Attrition rate records how employees move out of the job. It is calculated by dividing the number of leavers in specific period of time (usually one year) by the average of employees during the same period and multiplying it by 100. The disadvantage of this method is that it does not take account of fluctuations within the period being measured (if the period is one year then it will not show up staff only staying for a few months) and it treats the workforce as a homogenous entity (turnover may be higher in some departments than others.).
ii. Vacancy rate is the extent to which an organization has unfilled positions (Buchan and Calman, 2004) and the cause may be linked to internal as well as external factors.
iii. Stability Index seemed to be appropriate, especially when trying to measure staff retention. This is calculated by dividing the number of staff with more than one year's service by the number employed one year ago, and multiplying the figure by 100. This index shows how stable the workforce is. However, all of these indicators require good data on losses.

But, one main impediment is lack of complete and accurate data on workers flow, in most of developing countries, and it does not allow precise measurements of turnover and

vacancy rates. Still, available data indicate that many Sub-Saharan African Countries are experiencing high vacancy rates. So far, reported vacancy rates worldwide, include:

i. In the U.S., it is estimated that 126,000 nursing posts are currently unfilled and that the shortage will hit 500,000 full-time equivalent staff in 2015 (USDHHS, 2002).
ii. Canada has an immediate need of 16,000 nurses and an estimate shortage of 59,000 to 113,000 nurses by 2011 (CAN, 2002).
iii. South Africa: One third of all public health posts in South Africa are unfilled (Lehmann and Sanders, 2004).
iv. Zimbabwe: Out of established positions for medical doctors, only of 55% have been filled
v. Malawi: Vacancy rate of 36% for doctors in public health services (Schrecker and Labonte, 2004).
vi. Ghana: Vacancy rates reached 42% for public-sector physicians and 72.8% for specialists (WHO, 2003).
vii. Tanzania about 65% of required health work force is not yet filled (MoHSW, 2008)

Increasing vacancy rates is a reflection of poor attraction and retention of health workers over time. Furthermore, staff attrition has important impact on service provision and costs due to the "winding down" prior to departure, and the time needed for the new recruits to get the required experience.

While acknowledging the fact that there is high vacancy rate in many of the Sub Sahara Africa for different carders of Health Care Workers, it is also imperative to understand the predictors of Human Resources for Health (HRH) attrition, as stipulated by the empirical evidence. These will help the health managers to reduce the uncontrolled turnover. However the literature asserts to the fact that, HRH attrition is often influenced by dissatisfaction with one or more attributes of the working and living environment, such as:

i. Deteriorating living and working conditions (Martineau et al, 2006; Lehmann and Sanders, 2004, Vujicic et al, 2004).
ii. Weak performance management, leadership and supervision structure (WHO 2005, Huddart and Picazo, 2003; MOH, 1999).
iii. Inadequate equipment and supplies (Martineau et al, 2006; Mathauer and Imhoff, 2003).
iv. Lack of recognition for good work (Naidoo, 2000).
v. Stress due to heavy workload (Martineau et al, 2006; Mathauer and Imhoff, 2003).
vi. Limited opportunity for career development and advancement (Martineau et al, 2006; Buchan and Dovlo, 2004).
vii. Safety and security concerns, including those related to HIV/AIDS protection, care and risk (Schrecker and Labonte, 2004; Standing, 2000, CRHCS, 2004).
viii. Lack of or poor education facilities for children especially in the rural/remote settings (Martineau et al, 2006).

In effort to improve the situation, there have been a number of innovative attempts by the governments to improve attraction and retention of health workers in rural areas (Dussault, and Franceschini, 2003), such as: improved management systems including supervision, local recruitment, provision of free housing, providing greater access to continuing education as well as increasing wages over time.

In Tanzania, the Human Resources for Health situation do not differ much as compared to other Sub-Saharan countries. It is estimated that 74% of the health staff work in the government health facilities, followed by faith based facilities with a share of 22%. Private facilities employ approximately 3% and parastatal owned facilities employ 1% of the total workforce in the health sector. This pattern applies to almost all cadres although they differ in terms of percentages. On the other hand, the allocation of human resource as per establishment has been a critical issue since independence. The current situation of human resources in public health care facilities remains in crisis; to date, the government has been able to allocate about 35% of the requirement for qualified professionals (MoHSW, 2008). The problem appears to be more serious in lower health facilities and underserved areas, such as rural areas and remote regions.

Thus it is the aim of this study to explore the preference structure of low level trained health workers on job attributes and location, with specific emphasis on what will attract them to work in rural areas.

*1.2 **Problem statement***

One of the biggest challenges that policy makers face in the health sector in Tanzania is how to attract qualified human resources to the rural and remote parts of Tanzania. Since independence, the availability of health workers in sufficient numbers, with adequate skills, in the rural has been a critical issue,where currently the government has been able to only employ 35% of needed work force. The distribution of the employed health workers within the country is characterized by geographical imbalance. The imbalance is attributed by reluctance of qualified health workers to work in remote and rural areas within the country.However the literature asserts to the fact that, poor attraction and retention is often influenced by dissatisfaction with one or more attributes of the working and living environment, such as; deteriorating living and working conditions; weak or poor leadership and management; inadequate drugs, equipment and supplies; lack of recognition for good work; limited opportunity for career development and advancement; lack of or poor education facilities for children especially in the rural and remote areas. The observed shortage and misdistribution of health workers has direct effect on delivery of health care service to a large segment of the population, of which about 80% live in rural areas.

Government through Ministry of Health and Social Welfare, in recognition of the above problem and being the largest employer of the health work force, has taken step further to developed HRH strategic plan (2008-2015). The Plan, among other things, is targeting to increase intake in training and ultimately health work force output; with more emphasis on

lower and mid-level cadres. In an effort to reach this target of increasing output lower carder health workers, the MoHSW *inter alia*, re-introduced low level cadres such Clinical Assistants and General Nurses. Low level trained health workers, which takes shorter time to graduate but with bit improved clinical and nursing skills. This has been decided basing on the fact that lower carders, have been easily attracted and retained in rural areas. Since this is new move, less is known on how they would respond to known job attributes; given that job location have different levels of attraction. Also it is not known as to what is the relative importance of different job attributes or incentives (financial or non-financial) for low level trained health workers while eliciting their choices for particular place; particularly their attraction to rural and remote areas.

1.3 ***Research Questions***

i. What are the most important incentive (job attributes) that would improve attraction and retention of low level trained health workers in rural areas
ii. What are the incentive preference of different sub-groups within low level trained health workers (carders and social demographic factors e.g. sex, age, marital status etc.)
iii. What is the preferred incentive package that aim to improve attraction and recruitment of low level trained health workers in rural areas

1.4 ***Rationale***

Gaining insight into incentives (attributes) or package of incentives that elicit choices of low level trained health workers to work in particular location would be an important policy contribution to the Ministry of Health & Social Welfare (MoHSW) and other policy makers through designing policy strategy that will aim towards improving their attraction in rural areas and hence solve the problems associated with geographical distribution of work force within the country. Also the result of this study will contribute to the body of knowledge on the combination of factors that affects choice preference for particular location for low level trained health workers. Therefore this study tries to find out some attributes that affects the choice of working place among Tanzanian low level trained health workers. It will also shed more knowledge on personal preference structure affecting attraction amongst low level health workers in Tanzania. The Ministry of Health and Social Welfare needs more information on the possible policy recommendations to tackle the problem of health work force imbalances, for both rural and remote area as well as geographical misdistributions making the information that will be generated to be of vital importance. Additionally, the results of this study will strengthen the evidence base for effective human resource strategies in attracting low level trained health workers in rural and remote areas, given the fact that, it is an area which has been ignored by research for a long time.

1.5 ***Research Objectives***

1.5.1 Broad Objective

To determine the financial and non-financial incentives that will attract low level trained health workers to work in rural and remote areas.

1.5.2 Specific Objectives

The study has the following objectives:

i. To assess the relative importance of job incentive that aim to attract low level trained health workers in rural areas
ii. To assess incentive preference of different sub-groups within low level trained health workers (carders and social demographic factors e.g. sex, age, marital status etc.)
iii. To determine the preferred incentive package that aim to improve attraction of low level trained health workers in rural areas

CHAPTER TWO

2 LITERATURE REVIEW

2.1 HRH Situation in Tanzania

The situation in Tanzania is not far from the picture that is seen in other developing countries, specifically in the Sub-Saharan Africa. The country is estimated to have a population of 38.7 million and an annual population growth rate of 2.9%. About 76.9% of the population lives in the rural area (census, 2002). Since independence, health services have been largely prerogative of the state. Health care facilities were redirected towards rural areas. Currently, the available primary health facilities include 4,679 dispensaries, 481 health centers and 95 district hospitals. However the number of these facilities is expected to increase as results of new policy goals under Primary Health Care Development Plan (Kiswahili acronym MMAM), where it directs establishment of dispensary in every village, a health center in every ward and a district hospital in each district. However, the health sector is challenged to meet the health related Millennium Development Goals, despite the fact that the country has a high burden of diseases of which the major cause is malaria, HIV and AIDS, TB and Leprosy, malnutrition and micro-nutrient deficiencies, child illnesses, accidents and non-communicable diseases.

The TanzanianHealth Policy aims to facilitate the provision of basic health services, which are proportional, equitable, quality, affordable, sustainable and gender sensitive; which ultimately it will transforms into a healthy community. However realizing this mission requires availability of strong health care system, of which at the central to it, is human resource for health.

In Tanzania, it is estimated that 74% 0f the health staff work in the government health facilities, followed by faith based facilities with a share of 22%. Private facilities employ approximately 3% and parastatal owned facilities employ 1% of the total workforce in the health sector. This pattern applies to almost all cadres although they differ in terms of percentages. On the other hand, the allocation of human resource as per establishment has been a critical issue since independence. The current situation of human resources in public health care facilities remains in crisis; to date, the government has been able to allocate about 35% of the requirement for qualified professionals (MoHSW, 2008). The problem appears to be more serious in lower health facilities and underserved areas, such as rural areas and remote regions (seen Tab.1).

Table 1: Public Sector Human Resources Shortage by Facility Level (2006)

Facility Level	**Shortage in %**
Referral Hospitals	48
Regional Hospitals	66
District Hospitals	67
Health Centers	59
Dispensaries	69

Besides, Kurowski and Dominick, 2005 assert that, between 1994/95 and 2002/2, the active supply of health workers decreased from approximately 67,600 to 49,900 health workers (29%).

Disparities exist in the geographical distribution of health staff to districts and in urban/rural differences. There are significant differences in the number of health personnel per capita in different areas of the country. Differences in staffing levels are typically larger across districts than across regions, partly because some districts are hosting regional or tertiary hospitals with significantly higher staffing levels than ordinary district hospitals. Kurowski et al. (2004) corrected for this infrastructure effect by comparing staffing levels across districts at the dispensary level. They still found substantial geographical differences at the district level. Not surprisingly, urban areas are overrepresented in the group with high staffing.

Despite the national averages, it is more evident that there are huge geographical differences. As shown in fig. 1, the number of people to be served by one doctor was found to be very high in three regions namely Rukwa (309,000), Mwanza (308,000) and Shinyanga (306,000). The regions with the lowest population per doctor were Arusha (39,000) and Coast (42,000). The critical shortage of medical doctors has led to a situation where by lower cadres such as Assistant Medical Officers (AMO) Clinical officers (CO) to the most available work force in the districts and rural area.

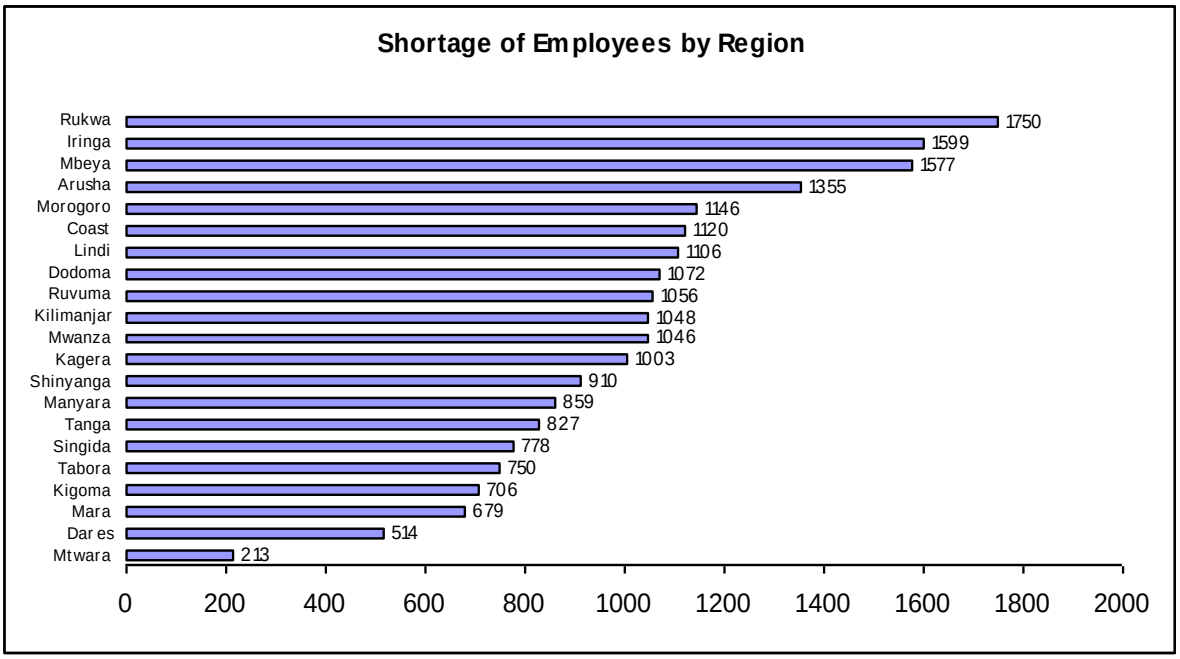


Figure 1. Shortage by Region (MoHSW, 2006)

*2.2 **Incentives and HRH Attraction, theEmpirical Evidence***

2.2.1 Human Resources for health Attraction

Understanding the gap in the heath work force and its geographical imbalance, is paramount in solving the problem, however it worthy looking at ways to improve attraction through incentives schemes to the human resource for health as one way to overcome urban- rural disparities. Currently the attraction and retention of health care staff is more and more recognized and supported as a key issue. Increased demand for health workers arises when employers are willing to contract workers and are able to provide salaries and working conditions that will attract and retain staff with the desired skills

(Armstrong, 1999; Dielemann, et al., 2003; Mathauer and Imhorff, 2005 & Vujicic et al., 2004).

2.2.1.1 Incentives

The role of incentives in attracting, retaining, motivating, satisfying and improving the performance of health care workers is asserted by body of evidence in both developed and developing world (Mathauer and Imhoff, 2006). However, application of incentives vary depending on intended outcome, type of organisation or employer; and whether applied to groups or individual employee.

Incentives can have a positive impact in staff attraction and retention, motivation that result in efficiency and effectiveness which translate into best performance; however, such initiatives should be sustainable and take into account the context and implications to the specific carder of staff, country and particular locality. A number of recent initiatives in Sub-Sahara African countries are trying to assess the impact of different incentive schemes such as working conditions, houses, salaries, scholarships, and career development (Vujich et al., 2004). In this regards, it can be categorized based on the form of which is given to the intended recipient, being financial or non-financial.

2.2.1.1.1 Financial incentives

Although some theorists like Herzberg believe that money is not a positive motivator (although lack of it can de-motivate), however pay systems are designed to incentivize and motivate employees. This is supported the scientific (Theory X approach) in particular,

argues that workers respond to financial rewards. Getting employee pay right (often referred to as the "remuneration package") is a crucial task for any organisation. Largely, financial rewards are important because:

i. People feel strongly about it. Pay helps to satisfy many needs (e.g. security, esteem needs, resources to pursue self-actualization)
ii. It helps attract reliable employees with the skills the organisation needs for success
iii. Pay also helps retain employees – rather than them leave and perhaps join a competitor
iv. For most employees, the remuneration package is the most important part of a job – and certainly the most visible part of any job offer.
v. There are many methods of financial reward e.g. salary, bonuses, overtime pay etc.

Provision financial incentives can be seen as crucial aspect of attracting and retaining health workers to work in participial location. However, it crucial at this stage to highlight the limitation of financial incentives in attracting employee, as explained by anxiety, comparability, and adaptation to the new pay (Vujici et al 2004; Kigma, 2003).

2.2.1.1.2 Non-financial incentives

Non-financial incentives equally comprise the human related quality management tools, namely supervision, feedback, staff appraisals, staff satisfaction surveys, clear leadership and guidance, clear organizational objectives and missions, and staff participation mechanisms (including staff meetings), adequate training, as well as self-assessments. Ultimately, these quality management tools aim at improving staff working conditions,

targeted improvement of their skills, and also their motivation through clear acknowledgement and recognition of staff needs (Mathauer and Imhorff, 2005).

However combining the financial and Non-financial incentives gives even better outcomes (Willis-Shattuck et al., 2008). Furthermore, it is argued that financial incentives, career development (further training), housing, adequate resources and appropriate infrastructure and management issues are core factors (Dielemann, et al., 2003;Vujicic et al., 2004). Manongi et al., (2007), observed similar findings in a study conducted in Northern Tanzania. Multiple cadres of health staff working in government primary health care facilities, from nurse auxiliary to assistant medical officer, were invited to contribute to the investigation. It was concluded form this study that both financial and non-financial incentive need to be applied together for better outcome in terms of attraction, retention and motivation of health workers, particularly for those working in rural and remote areas.

This approach can help making rural jobs more attractive, which are critical needed to serves people's lives. However the expected effect of combination of incentives depends also on scheme, the target carder of health care workers, as well as where is applied. Empirical evidence asserts to the importance of Opportunities for further education for upgrading and career development, provision of housing and availability of drugs and medical supplies (Zaidi, 1996; Chomitz *et al*., 1998; Serneels *et al*., 2007).Other social demographical factors, such as marital status, having children, educational level place of residence have effect on the how individual choose a location to work (Chomiz et al, 1998; Dussault and Franceschini, 2006; Serneels *et al*.,2007).

*2.3 **Workforce Motivation Theories***

Different theories have been put forward to highlight and elucidate the factors impacting on workforce mobility. Some of these include: Neoclassic Wage Theory e.g. Taylor & Scientific Management, which suggests that, the choice is driven largely by financial motives (Halfacree, et al., 1998) and by the probability of finding employment (Tadaro,1976). Second, the Maslow model (the hierarchy of needs) and third, Hertzberg (two factorial model distinguishing between happiness with the job and motivation to perform well) are the prominent behavioral models (Armstrong, 1999).

2.3.1 *Taylor and Scientific Management*

Taylor from his theory of "scientific management" he made three key assumptions about human behaviors at work:

i. Man is a rational economic animal concerned with maximizing his economic gain;
ii. People respond as individuals, not as groups
iii. People can be treated in a standardized fashion, like machines

Taylor had a simple view about what motivated people at work, which is money. He felt that workers should get a fair day's pay for a fair day's work, and that pay should be linked to the amount produced. Workers who did more than a fair day's work (e.g. exceeded the target) would be paid more.The implications of Taylor's theory for managing behaviours at work were:

i. The main form of motivation is high wages, linked to output
ii. A manager's job is to tell employees what to do
iii. A worker's job is to do what they are told and get paid accordingly

However, the most obvious weakness in Taylor's approach is that it ignores the many differences between people. There is no guarantee that a "best way" will suit everyone. Secondly, whilst money is an important motivation at work for many people, it isn't for everyone. Taylor overlooked the fact that people work for reasons other than financial reward

2.3.2 Maslow's hierarchy of needs

Maslow's Hierarchy of Needs is a "content theory" which consisted of two parts: the classification of human needs, and consideration of how the classes are related to each other.The classes of needs were summarized by Maslow as follows:

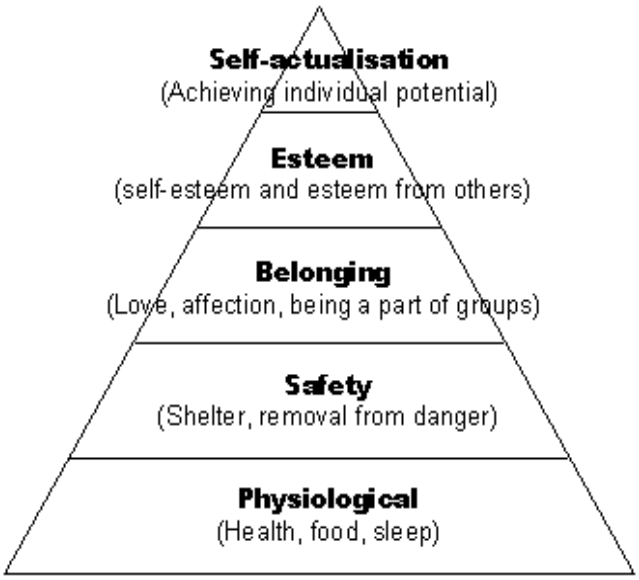


Figure 2. Maslow’s Pyramid

The explanation of Maslow’s theory starts the bottom of the hierarchy (pyramid), where by a person will initially seek to satisfy basic needs (e.g. food, shelter). Once these physiological needs have been satisfied, they are no longer a motivator. The individual

moves up to the next level which is safety needs at work, which could include: physical safety (e.g. protective clothing, protection against unemployment, loss of income through sickness etc.); Once this achieved, the next level is social needs where people want to belong to a group e.g. working with colleague who supports you at work, teamwork, communication etc. Esteem needs are about being given recognition for a job well done and respect of others. A promotion at work might achieve this. Lastly is self-actualization, where people think about themselves. It is often measured by the extent of success and/or challenge at work (Tay and Diener, 2011). Maslow's model has great potential appeal in the health filed, where management can find out which level each employee has reached, and decide on suitable rewards/ incentives.

2.3.3 *Herzberg two factor theory*

Herzberg's Two Factor Theory is a "content theory" of motivation", where he suggested a two-step approach to understanding employee motivation and satisfaction:

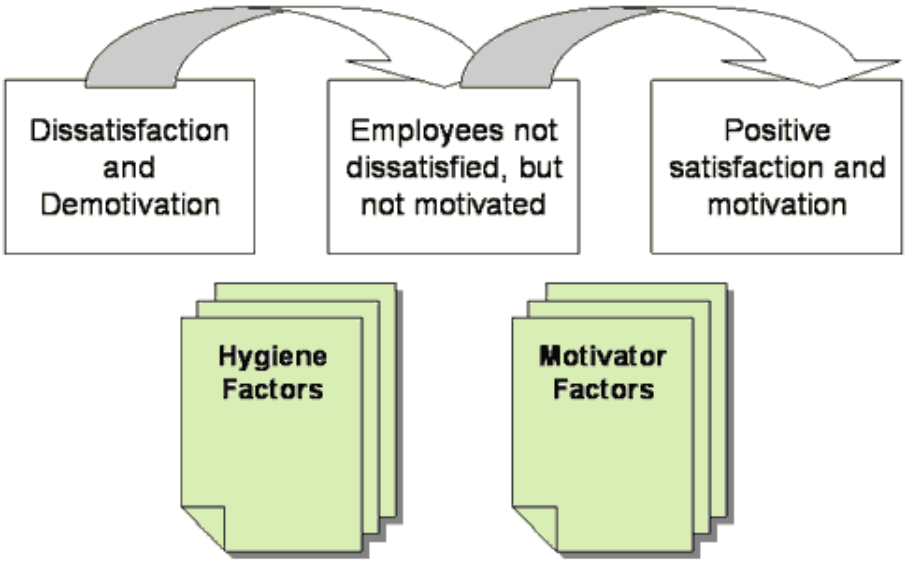


Fig. 3 Herzberg two factor approach

Hygiene Factors

Hygiene factors are based on the need for organisation to avoid unpleasantness at work. If these factors are considered inadequate by employees, then they can cause dissatisfaction with work. Hygiene factors include: company policy and administration; wages, salaries and other financial remuneration; quality of supervision; quality of inter-personal relations; working conditions and feelings of job security.

Motivator Factors

Motivator factors are based on an individual's need for personal growth. The existence motivator factors actively create job satisfaction. Effectiveness of these factors, motivate an individual to achieve above-average performance and effort. Motivator factors include but not limited to: status, opportunity for advancement, gaining recognition, responsibility, challenging / stimulating work and sense of personal achievement & personal growth in a job.

There is some similarity between Herzberg's and Maslow's models. They both suggest that needs have to be satisfied for the employee to be motivated. However, Herzberg argues that only the higher levels of the Maslow Hierarchy (e.g. self-actualization, esteem needs) act as a motivator. The remaining needs can only cause dissatisfaction if not addressed.

According to Herzberg, management should focus on rearranging work so that motivator factors can take effect. He suggested three ways in which this could be done: Job enlargement, rotation and enrichment

Thus following the discussion on motivation, it is quite clear that, motivation is an important element for any organisation success, as motivated employees are usually characterized by: higher productivity; better quality work with less wastage; greater sense of urgency; more employee feedback and suggestions made for improvements; more feedback demanded from superiors and management and working at 80-95% of their ability.

2.4 The proposed approach: Discrete choice experiment (DCE).

This is an econometrical model, which has been derived from the random utility theory, where economic rationality and utility maximization forms the basis of its assumptions (Hall et al. 2004). It is assumed that, in stating a preference the individual will always choose the alternative that yields his/her highest individual benefit, known as utility. Additionally, the utility yielded by an alternative is assumed to depend on the utilities associated with its composing attributes and attribute levels (Lancaster 1966). In other words, Y_{iq} is the utility of individual q for the i^{th} alternative and is assumed to be a function of its attributes:

$$Y_{iq} = X_i\beta_i + \varepsilon_{iq}$$

where X_i is a vector of attributes for the i^{th} alternative accompanied by a set of weights, β_i, that establish the relative contribution of each attribute to the utility associated with the i^{th} alternative, and ε_{iq} is the residual capturing the un observed variation in the characteristics of different options and any measurement errors.

According to Mangham et al (2009), DCE is a stated preference technique that presents respondents with sample of hypothetical scenarios drawn a prior from all possible scenarios according to statistical design. The scenarios comprise of two or more alternatives which vary along several attributes of interest and individuals are asked to choose one alternative. Among the advantage of DCE is the ability to generate information to indicate whether particular attribute are predictor of choice over alternative scenario and is able to generate information on relative importance of the specific attributes used to describe the alternatives in the scenarios. Most important, DCE has the advantage of presenting scenarios that are relevant to the respondent (Louviere et al., 2000**).** The steps for conducting the DCE are; identification of attributes, identification of levels, experimental design, data collection, data analysis.

2.4.1 *Identification of attributes/criteria*

This involves identifying relevant factors to be included in the DCE. This engages literature review, expert's opinions, and if, necessary key informant interviews. According to Louviere (2000) and Mangham et al (2009), two issues need to be considered when deciding which attributes will be included in the DCE. First, attributes should be relevant to the requirement of policy makers. Secondly, attributes need to meaningful and important to the respondents.

2.4.1.1 Identification of criteria levels

This involves assigning levels (intensity) to the identified factors. It is expected that the identified levels will include both quantitative and qualitative measures. Literature describes three key success factors when choosing the levels for each attribute (Street and Burgess, 2004) being: must be plausible and actionable to the respondents. Also, must be constructed

so that the respondents are willing to make trade-offs between combinations of the attributes.

In addition, Louviere (2000) underscores the importance of having equal number of levels for each attribute to ensure more efficient designs.

2.4.1.2 Experimental design

In this stage, the hypothetical choice sets are designed including the formation and pairing of choices. The choices will be set by the combinations of the selected attributes and relevant levels. The attributes remain the same in each choice, but the levels that describe each attribute may vary across the choices. According to Louviere et al (2000), one of the crucial objectives of the experimental design is to create the DCE in such a way that the number of choices is minimized while being able to infer utilities for all possible choices – which implies keeping the choice task simple to the respondents and at the same time being able to extract all the necessary information from the choices. In this regard, Street et al., (2008) suggest the useof fractional factorial design to limit number of choice.

2.4.1.3 Data collection

Once the optimal sets of choices are addressed, the DCE questionnaires are developed. Bennett & Blamey (2001) noted the questionnaire must be constructed in such a manner that there is an expectation that the information provided by the respondents will be used in some fashion for making decisions. Further, if the respondents view the process as entirely hypothetical then their responses will not be meaningful in any economic sense. When conducting a DCE it is important to consider the data collection procedure. Four main methods for collecting data exist; Face-to-face interview, Telephone interview, Mailed

questionnaires, E-mail/internet, Gathering in ‘central facilities’ and Combination of the above (Bennett & Blamey 2001).

The respondents are asked to choose one of the two or more options of each choice. Based upon the sampling frame, the sampling strategy and sample size are determined. According to Louviere et al (2000), one sampling strategy is simple random sampling, in which all individuals from the sample frame have equal opportunity to be chosen as potential respondents; another sampling strategy might be dividing the frame into groups, each representing a portion of the population, depending upon characteristics such as sex, income, residential location etc. The size of the sample depends on the number of question given each respondent, the size of the population, and the statistical power that is required of the model derived.

2.4.1.4 Data analysis

This includes organisation and typing of data, conduction of model estimation and policy analysis, and a critical discussion of the study and its results and a critical discussion of the study and its results, i.e. a discussion of the validity and Reliability of the study and comparison with other similar studies. Louviere et al (2000)noted that, when analyzing the data it is important to take a critical approach as misinterpretation of the results can lead to inefficient solutions and consequently resulting to undesirable policy implications.

In a DCE, it is standard practice to assume a relationship on the criteria and predicted probability scores as linear function. Logistic regression models are used to analyse the

response data. Normally, the regression model is determined by the type of the response data. The results are presented as regression coefficients which indicate the probability of selection of an intervention.

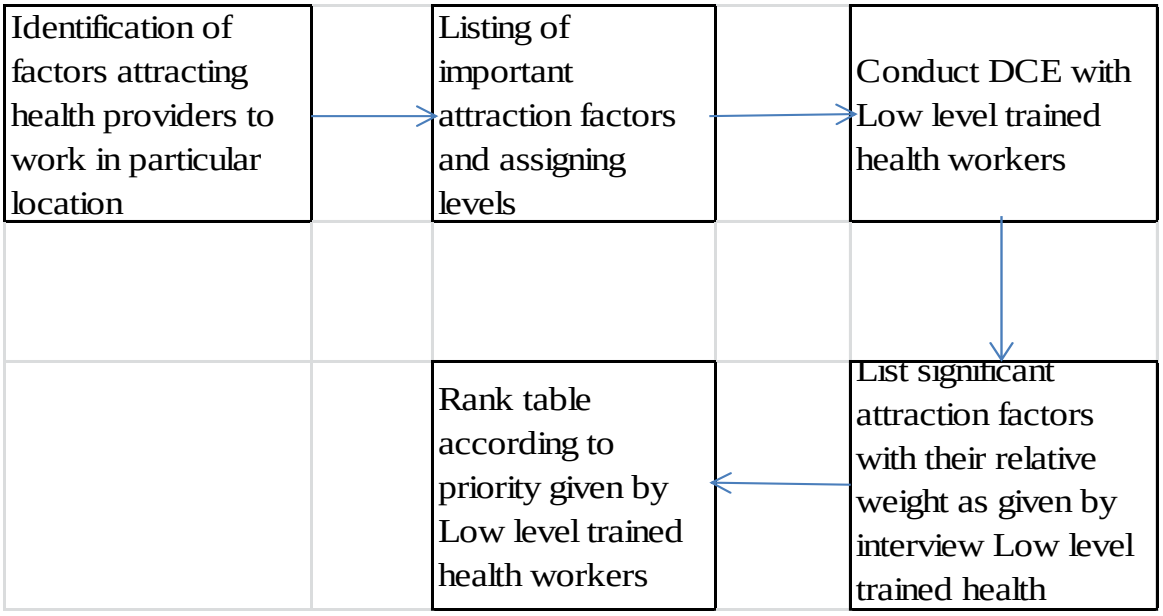


Figure 4: Conceptual framework for DCE process

CHAPTER THREE

3 METHODOLOGY

3.1 Introduction

The chapter presents the study area, study design, target and study populations, sampling techniques, research instruments,and variables to under study, ethical considerations, data collection procedures, data management and analysis and the limitation of the study

3.2 Design of the study

The design of the study is quasi economic experimental,cross sectional explorative study. The study employed the experimental economics of Discrete Choice. Discrete Choice Experiment (DCE) framework to consider various low level trained health workers preference in weighing up competing scenarios in choosing their place of work; being rural or urban areas.

The method has its theoretical foundation in random utility theory and relies on the assumptions of economic rationality and utility maximization (Hall et al. 2004). In stating a preference the individual is assumed to choose the alternative that yields his/her highest individual benefit, known as utility. Moreover, the utility yielded by an alternative is assumed to depend on the utilities associated with its composing attributes and attribute levels (Lancaster, 1966).

In this model, it is assumed that low level trained individual, such as Clinical Assistants and General Nurses, make rational decision regarding job selection. Thus they have a

complete ranking of jobs with varying attribute levels. This ranking is given by their preferences for the attributes and their respective levels. Also, as rational economic individuals, the health workers maximise their utility given their preferences for different job attributes; they will always choose the alternative that matches best with their preferences. The preferences are influenced by background characteristics of the individual like sex, religion etc. Furthermore for comparison purposes, ranking of the same five job attribute was done using simple ordering method.

*3.3 **Study area***

The study was conducted in three schools: Musoma Clinical Assistant Schools and Tarime Nursing schools in Mara region; and Geita Nursing schools in Mwanza region. The three selected schools are all owned by Ministry of Health and Social Welfare, operating under the Directorate of Humana Resource Planning and Development. All schools are accredited by National Council for Technical Education (NACTE).The schools offer two years residential training for candidates who centrally selected for the course of Low level trained health workers. All students were offered accommodation in the campus for area for the period of two years.

*3.4 **Study population***

The target population for the proposed study was finalistlow level trained health workers studying in Tanzania. The selection of this group was based on either is a new carder or its curriculum has been revised or the entry criteria have changed by the Ministry of Health and Social Welfare. This aimed at curbing the health work force crisis in the country

(MoH, 2008), as well as implementation of the ten years Primary Health Care Development Plan (PHCDP). Under this Program the government is planning to build dispensary to each village as well as health center to each ward.On the other hand, the move is envisaged to bring services more closeto the people as well improving quality of services that is why plan is targeting both infrastructure and the health work force.

Low level trained health workersare expected to be equipped with knowledge and skills that will enable them to do multiple functions at the Dispensary and Health Centre level. This includes attending common medical conditions, minor surgical practice, dispensing of medicines, maternal and child services as well conducting delivery to pregnant mothers and the conducting normal deliveries. Also they are expected to be in-charge of Dispensaries, thus they have leadership roles in their day to day activities.

*3.5 **Sample size***

3.5.1 Sample size

The determination of the sample size for this study is based on the formula for categorical data as presented by Bartlett II, et al (2001), as shown below.

$$N = z^2 p \left(\frac{100 - P}{\varepsilon^2} \right)$$

Where: N=Sample size

Z= level of confidence which is 1.96

P= proportion of low level trained health workers who choose to work in rural area

ε =margin of error

Nevertheless, the value for P is assigned to be 50%, as to our knowledge will not find a choice of placement study previous study in Tanzania on low level trained health workers. The degree of precision is set at 8% while the standard level of confidence is 1.96.

Given that,

P=50%

Z=1.96

ε =8%

From above formula,

$$n = \frac{1.96^2 \text{ X } 0.5[1-0.5]}{[0.1]2}$$

$$= \frac{3.8416 \text{ X } 0.25}{0.0064}$$

n= 150

Therefore, the required minimum sample size of respondents will be 150. By adding 10% of anticipated non respondents, thus sample size will then be **165.**

*3.6 **Sampling Method***

A cluster sampling method was used to select Schools for low level trained health workers. In this method a sampling unit is a training school. The country was divided in

eight zones as set by Ministry of Health and Social. The zones are: Central, Eastern, Lake, Tanga, Northern, Southern highland, South West highland, Western and Southern. From this lists, Lake Zone was randomly selected, which comprises of Mara and Mwanza regions. This zone has three schools which trains Low Level Carders, namely: Musoma Clinical Assistant Schoolsand one Tarime Nursing schools in Mara region; and Geita Nursing schools in Mwanza region. All students in the final year study had equal chance of participating in the study. This is supported by the fact that there is no big variation between schools in terms of students being enrolled, as all schools receive students from Ministry of Health and Social Welfare. The application and selection of students to study Clinical Assistant and General Nursing course is done centrally through Directorate of Human Resource for Health & Training (DHR) at the Ministry of Health and Social Welfare (MoH&SW). Interested individuals apply directly to the Permanent Secretary, MoH&SW. The successfulcandidates are randomly posted to different schools depending on the capacity of the school. Students were found to be at schools on the day of data collection were included in the study, upon signing the consent form.

*3.7 **Inclusion and Exclusion Criteria***

3.7.1 Inclusion criteria

Given the objectives of this study, allLow level trained health workers in their final year of study in the sampled training institution were eligible to participate in this study. This included, both are in-service or pre-service students. The reason that we are only interviewing the finalist students is that soon they will graduate and being employed, thus their view will be the most close to reality, and it matters to them when it comes to employment and selection of location to work.

3.7.2 Exclusion Criteria

This study excluded the following categories of students:

First, all first year students, whose focus may be more on getting to final year and not what are the employment prospects. Also time lapse is of essence here, for person to determine place of work, as what matters to her/ him today may not necessarily be important after two years. So we want to determine the closest thoughts to the time of employment.

Second, students who are not from Tanzania, being in both first and second year, studying in the same school,as they are not expected to work in Tanzania.

3.8 ***Variables***

3.8.1 Dependent Variables/Attributes

Attraction to work in particular area, which can be urban or rural, thus this is a binary response variable with values one for urban and zero for rural.

3.8.2 Independent variables

These include wage, housing, training, Drugs, Equipments and Medical Supplies, and Management and Leadership. The variables are further describe in the table below

Tab 2: Summarized Attributes and Levels

Attributes (Variables)	**Type of Variable**	**Levels**	**Assigned value**	**Expected effect on attraction**
Net Monthly Pay	Dummy variable	Current Government Base line	0	
		Current Government Base line + 25%	1	+
Housing (Basic)	Dummy variable	Not provided	0	
		Provided	1	+
Training (Upgrading)	Dummy variable	Not Provided	0	
		Provided	1	+
Equipments and Drugs	Dummy variable	Inadequate	0	
		Adequate	1	+
Leadership and Management	Dummy variable	Poorly Functioning	0	
		Functioning	1	+

*3.9 **Tools and Pretesting***

3.9.1 Discrete Choice Experiment Instrument (DCE)

The design of the DCE questionnaire was done manually, following the standard steps as stated by Louviere et al., (2000**).** The identification and selection of relevant attributes was based on the published literature. The selected attributes had to fulfill two important criteria; first, relevance to the requirement of policy makers and secondly, meaningful and important to the respondents (Louviere 2000). Looking at the focus of the study, literature asserts to different job attributes that could be important to this category of health workers, but we have chosen to focus on five of them which suffice the criteria mentioned above.

3.9.1.1 Net Monthly Pay

Related to financial gains that employee receives as compensation after providing service for one calendar month as per government pay scale.

3.9.1.2 Housing

This attribute relates to working environment, where government provides basic housing Health worker, that it is rudimentary, having no electricity or running water, and with at best an outside toilet.

3.9.1.3 Availability of Drugs, Equipment and other Supplies

This attribute is related to working environment where by, the standard of equipment and level of availability of drugs that is provided as per level of the facility as stipulated on National Essential Drug List and Standard Treatment Guide Line

3.9.1.4 Training (upgrading)

This attribute measures the availability of training opportunity as part and parcel of continuing professional development, in terms of access to further education and up-grading.

3.9.1.5 *Leadership and Management*

This attribute relates to the quality of human resources management in workplace. It includes things like mechanisms for staff support, supervision and appraisal.

Levelswere assigned to each of the selected five job attributes above with consideration of the factors as described by Ryan (1999) and the importance of having equal number of

levels for each attribute to ensure more efficient designs(Louviere2000). Thus basing on these facts, two levelswerefixed for each attribute, as described below.

3.9.1.6 Net Monthly Pay

This attribute takes on two different levels. The first represents the base salary low level carder employed upon completion of their studies in the civil service pay scale, while higher level is 1.25 multiple of this average base level.

3.9.1.7 Government-provided Housing

This attribute measures the existence of government and has two possible levels. "Not provided" means there is no housing provided by the government as part of the conditions of employment. "Provided" housing means the government provides housing for the health worker, but that it is rudimentary, having no electricity or running water, and with at best an outside toilet.

3.9.1.8 Availability of Equipment and Drugs

This attribute simply takes on two values – "inadequate" and "adequate". "Inadequate" is the standard of equipment and availability of drugs that you might expect in a poorly equipped public facility in the given location and there is erratic drugs supply. "Adequate" is that level of supplies and conditionof equipment as per stipulated guideline, where equipments are function and there is uninterrupted drug supplies

3.9.1.9 Training (upgrading)

This attribute measures the availability of training opportunity as part and parcel of continuing professional development, in terms of access to further education and upgrading. It has 2 levels - "Provided" and "Not provided". Provided, means there are

sufficient opportunities available, with clear policies on the criteria needed to qualify for places. Not provided, means there are no opportunities, with no clear guidelines on who can avail of them.

3.9.1.10 Leadership and Management

This attribute relates to the quality of human resources management in your workplace and it has two values – "poor" and "functioning". "Poor" describes a management system with either no mechanisms or poorly administered mechanisms for staff support, supervision and appraisal. "Functioning" describes a system where there are transparent, accountable and consistent systems for staff support, supervision and appraisal.

The experimental design involved formulation and pairing of hypothetical choice sets. The choices were set by the combinations of the selected attributes (incentives) and relevant levels. The attributes remain the same in each choice, but the levels that describe each attribute vary across choices. According to Louviere et al (2000), one of the crucial objectives of the experimental design is to create the DCE in such a way that the number of choices is minimized while being able to infer utilities for all possible choices, which implies keeping the choice task simple to the respondents and at the same time being able to extract all the necessary information from the choices. In this regard, fractional factorial design was used to limit number of choice (Street et al., 2008). To achieve optimal DCE design, the tool has been manually developed using the Index and Master plan for the construction of experimental plans based on the work of Kokur et al (1982).The catalogues index and master plan allows for orthogonal estimation of the main effects and denoted interactions; all estimates of effects are uncorrelated. Under this design, where

there is five attributes and two levels for each, sixteen choice sets were deigned which are un-correlated (Appendix I).

Different combinations of the attributes represent different *job descriptions which are hypothetical*. In each pair, the jobs are referred to as "Job A" and "Job B". The attributes will differ slightly across pairs, and each has advantages and disadvantages. Respondent will need to trade-off these advantages and disadvantages in choosing which of the two he or she prefers. The job descriptions are intended to represent a range of employment Clinical Assistants and General Nurses in their after completion of their studies.

The questionnaire also consisted of section where respondents were asked to rank the five job attributes, by choosing the most three imports attributes and write them in descending order, with the first one being most important , while the least being the last.

Apart from the experimental and simple order ranking, questionnaire also consisted of section that solicited information social demographic factors of the respondent such as age, sex, place of residence and education background

3.10 ***Recruitment and training of assistant researchers***

Oneresearch assistants with health or human resources background were recruited. They were trained for two days and the training covered issues on ; briefing of the study, familiarization of research tools and how to administer tools and to conduct the whole exercise. Also they were introduced to research ethics and other logistics. The task of the

research team was to interviewLow level trained health workers finalists using the DCE questionnaire.

3.11 ***Pre-Testing of the Research Instrument:***

Pre testing of the instrument wasdone prior to the commencing of the study, at Bagamoyo Nursing School; which is not among the selected health training schools. This aimedat checking how the target population is going to understand the tool. Review of the questionnaire wasdone following the pre-testing and small changes were made. This included spelling mistakes as well as numbering of the tool.

3.12 ***Data collection***

This study collected data from Low level trained health workers (Clinical Assistants and General Nurses) in their final year of studies from Musoma Clinical Assistants School, Geita and Tarime Nursing Schools. Data was collected using Discrete Choice Experiment (DCE) tool to determine the relative importance of a range of incentives (attributes) that would attractlow level trained health workers in a particular location. Participants were presented with a self-administered questionnaire and asked to choose between different packages of attributes. These included incentives/ attributes as identified from the literature and previous studies. The research instrument was constructed in English, language which is a medium of instruction health training schools in Tanzania.

Specifically, procedure for data collection involved approaching individual study participants. Inclusion into the study was based upon fulfilling the predetermined criteria.

The informed concert was sought by signing the concert form. This was key step, as only those who signed the concert form were allowed to fill the questionnaire. Despite the fact that this was self-administered questionnaire, Participants were allowed to fill the questionnaire, upon being given further explanation on its content and how to fill each section. Research assistant was always available to provide assistance, if participant had any problem. Once the filling process was complete, the questionnaire was immediately reviews for correctness and completeness. Each questionnaire was finally coded and safely kept.

3.13 ***Data Management***

This involves data processing and quality assurance.Each day after field work the Principal Investigator and the research assistants convened a meeting discusses issues related to data collection, explored problem uncounted in obtaining data from participants. Data entry was done after completion of data collection exercise. Data were entered using SPSS version 14 statistical package.Data cleaning was performed before the analysis stage andwas imported to STATA version 6 for analysis

3.14 ***Data analysis***

Data analysis involved quantitative technique on the predictors of attracting of choosing a place of work. It is standard practice with DCE study to assume a relationship on the criteria and predicted probability scores as linear function. Logistic Regression Model wasused to analyse the response data.Specifically, a binary logit model was used in due to the fact that response variable was categorical and binary in nature. It takes a value of one if the person works in urban and zero if works in rural. The model was used to estimate the

probability/ likelihood of a person choosing to work in a rural area. Despite the fact that the appropriate estimator could be binary logit or probit model, this study used logit model. The choice has based on the fact that logit and probit models are indistinguishable from each other; however the main reason is largely on convention and convenience. (Long, 1997). In this study, the binary logit model was convenient, and the following equation describes the model used to estimate the binary logit.

$$Li = In\left\{\frac{Prob(y=1)}{1-Prob(y=1)}\right\} = \sum_{k=1}^{k} \beta_k \chi_k$$

Where $\left\{\frac{Prob(y=1)}{1-Prob(y=1)}\right\}$ is simply the odds ratio in favour of y= 1,

β= independent variable coefficient and χ = independent variable.

In order to estimate the likelihood of choosing to work in rural area, the following general logit model was used in STATA.

$$\text{In}\left\{\frac{\text{Prob}(y=1)}{1-\text{Prob}(y=1)}\right\} = \beta_0 + \beta_1 * \text{NetPay} + \beta_2 * \text{Training} + \beta_3 * \text{Housing} + \beta_4 * \text{DrugEquip} + \beta_5 * \text{LeadManag} + \mu_i$$

Where 1= choosing urban, 0= choosing rural, β_0= intercept of indicating the expected value of y when all values of β1-5 = 0, β1-5 = coefficient of independent variables, μi = error term, NetPay= net monthly pay, Housing= Basic Housing, Training= upgrading training, LeadManag= Leadership and management, DrugEquip= availability of drugs and

equipment's

Multivariate analysis using binary logit was performed so as to determine the coefficients as well as odds ratio for the five jobs attributes.It provided means to predict preferences of Low level trained health workers for either working in rural or urban area, as well as ranking the of independent variables (net pay, housing, training, leadership and management and availability of medicines and supplies).Probability value was used to determine, if the attribute is significant, with a cutoff point, P-value of 0.05 or lower was considered significant.

3.15 ***Ethical aspects***

Ethical clearance was obtained from the research and publication committee of MUHAS before the study begins. Permission to conduct study was granted by the Ministry of Health and Social Welfare. Moreover, Principals of the participating schools were be briefed about the study before meeting with participating finalist low level trained health workers.

Informed consent was sought and obtained from respondents before they filled the questionnaire. Also respondents were informed about the objectives of the study and that their participation is purely voluntary and they were free to decline or withdraw at any time in the course of the study. It was further clarified that, the provided information was for the research purposes and will therefore strictly dealt with high level of confidentiality.

3.16 ***Limitation of the Study:***

This study has the following limitations:

i. One of the dis-advantage of the DCE is the hypothetical nature of the job scenarios presented to the respondent, thus it may not represent reality and thus reduces concentration and seriousness of the respondent while selecting the choices. However the attributes wereselected in such way that they are closely related to actual situation on the ground. Also respondent were advised to be as muchobjective as possible while making their choices

ii. Boredom from filling the DCE tool. This was counteracted from the design stage, where by half factorial design was used as well as limiting the number of attributes and levels to the minimum possible without compromising the quality of information needed to be extracted from the respondent, i.e. the design is an orthogonal array. Usually literature asserts to less than 18 pairs as the boredom threshold (Mangham et al 2009).

iii. Inadequate sample size. If the sample size will not fulfill the requirement of the study the convenience sampling will be done for those whom will be available on the particular days.This may introduce sampling bias.

iv. Inadequate resources such as time and funds for the study

CHAPTER FOUR

4 RESULTS

4.1 Description of the Study Participants

One hundred and ninety five (195) low level trained health workers were interviewed in this study. These were final year students at Musoma Clinical Assistant School 33.3% (65), Tarime Nursing School 31.28% (61) and Geita Nursing School 35.28% (69).

Table 3 shows different social demographic characteristics of the respondents, where: majority of the respondents, were aged between 20 and 29 years 95.38% (186), and none was above 29 years of age. Sex distribution of the responded was almost equal, though females were slightly more 50.26% (98) than males. Of all study participants, 93.33% (182) were not married and the rest ware single; only 11.28% reported to be having one or more children; while 91.79% were Christians, the rest where Moslems. More than half 56.92% (111) reside in rural areas prior to joining their studies and none of the all respondents had prior employment in the health sector before joining studies.

Table 3: Descriptive Characteristics of the Sample

Variable	Category	Frequency (N=195)	Percent
School	Musoma Clinical Assistant School	65	33.33
	Tarime Nursing School	61	31.28
	Geita Nursing School	69	35.28
Carder	Clinical Assistant	65	33.33
	Nursing-General	130	66.56
Sex	Male	97	49.74
	Female	98	50.26
Age	<20 yrs	9	4.62
	20 - 29 yrs	186	95.38
Marital Status	Married	13	6.67
	Not married	182	93.33
Having Children	Yes	22	11.28
	No	173	88.72
Level of Education	Secondary School- Form Four	164	84.10
	Secondary School- Form Six	30	15.90
Religion	Christians	179	91.79
	Moslems	16	8.21
	Others	0	0.00
Employed prior to the course	Yes	0	0.00
	No	195	100
Residence	Urban	84	43.08
	Rural	111	56.92

4.2 Logit Regression Model results

The results of the DCE are shown in Table 4, where all coefficient had their signs in the expected direction, however only one (provision of training) was significant at 95%

confidence internal (P-value= 0.037). The Odds ratio for the five job attributes ranged from 0.83 (0.7-1.1), provision of training had the highest Odds ratio, while provision of basic housing 0.95 (0.8-1.1), has the lowest Odds ratio. Increase in net monthly pay, availability of medicines and supplies as well as good leadership and management had similar values of odds ratio and the confidence interval range of 0.93 (0.8-1.1). All of the five job attributes had odds ratio which their confidence interval does not cross zero. Thus ranking the job attributes, based on the value of the odds ratio (Table 4). The attributes are ranked as follows, from the highest to the lowest: provision of training, increase in net monthly pay, availability of medicines and supplies, good leadership and managementand provision of basic housing.

From these results (Table 4), it is evident that, low level trained health workers are less likely to stay in urban (odds ratio 0.83), and thus attracted to rural areas, if they are promised to have access to further training to upgrade their carrier.

Table 4: Relative importance of the job attributes attracting Low Level trained health workers in rural areas

Attributes (Variables)	Coefficient	Odds Ratio	P Value	DCE Ranking
Increase of Net Monthly Pay to Tsh. 362,000.00	-0.0686911	0.93 (0.8-1.1)	0.345	2
Provision of Basic Housing	-0.564663	0.95 (0.8-1.1)	0.437	
Provision of Training-Upgrading	-0.1832559	0.83 (0.7-1.1)	0.037*	1
Availability of Drugs and Supplies	-0.693354	0.93 (0.8-1.0)	0.346	2
Good Leadership & Management	-0.0481155	0.93 (0.8-1.1)	0.514	2
Log likelihood =-2154.0189 Pseud. R2= 0.0014 LR chi2 (5) = 0.3195 Prob>chi2 = 0.3195	Odds ratio estimated at 95% Confidence interval		*Significant at 5%	

Further analysis of subgroups within the Low Level trained health workers, based on carder and social demographic factors are shown in Table 5(a) and (b). In all models in Table 5(a) and (b), the confidence interval did not include zero, while provision of training was independently significant at 5% confidence interval, except for the following subgroups: Clinical Assistants, Nurses, Education (Form Four and Six), Urban residents, Females, less than 20 years of age, Married, those with children and Moslems at large.

Table 5(a): Choices of attributes of different sub-groups of Low level trained health workers (Carder, Education and Place of Residence)

Model	**Attributes(Variables)** Increase of Net Monthly Pay to Tsh. 362,000.00 Odds ratio	Provision of Basic Housing Odds ratio	Provision of Training-Upgrading Odds ratio	Availability of Drugs and Supplies Odds ratio	Good Leadership& Management Odds ratio
Carder					
Clinical Assistant	0.88(0.7-1.3) (0.31)	0.92(0.7-1.2) (0.52)	0.77(0.6-.0) (0.08)	0.91(0.7.2) (0.48)	0.97(0.8-1.3) (0.82)
Nursing-General	0.96 (0.8-1.2) (0.68)	0.96(0.8-1.2) (0.67)	0.87(0.7-.1) (0.21)	0.94(0.8-.1) (0.51)	0.95 (0.8-1.1) (0.59)
Education					
Secondary School Form Four	0.95(0.8-1.1) (0.47)	0.95 (0.8-1.1) (0.52)	0.85(0.7-.1) (0.10)	0.92(0.8-.1) (0.317)	0.96 (0.81-1.1) (0.57)
Form Six	0.88 (0.6-1.3) (0.48)	0.91(0.6-1.3) (0.60)	0.67(0.4.0) (0.076)	0.97(0.6-.4) (0.88)	0.95 (0.7-1.4) (0.76)
Residence					
Urban	0.98 (0.8-1.2) (0.85)	1.0 (0.8-1.3) (0.90)	0.99(0.8-.3) (0.96)	1.0(0.8-1.3) (0.92)	0.98 (0.8-1.2) (0.88)
Rural	0.88 (0.7-1.1) (0.19)	0.9 (0.7-1.1) (0.26)	0.71(0.6-.0) **(0.005)**	0.87(0.7-.1) 0.16)	0.94 (0.8-1.1) (0.53)

Odds ratio estimated at 95% Confidence interval

*Significant at 5%

Thus, the table shows that, for those groups (rural residents OR=0.71, Christians OR=0.82, not married, having no Child OR=0.81, Age= 20-29 and males OR=0.8) that prefers training in exchange for rural job, will more likely be attracted if promised further training. The table also shows that, students living in rural areas, their willingness to choose a rural job is strongly and significantly influenced by provision of upgrading training (P Value = 0.005). Conversely, age group less than 20 years, those with children and who were of Moslems denomination had odds ratios almost or equal to one for all five job attributes presented in the DCE experiments. This signifies their preference for urban jobs to rural ones.

Across the two cadres Clinical assistants and Nurses, none of the five job attributes significantly explained the model. The range of confidence interval shows that training had more likelihood of attracting them to choose rural job, (Table 5(a)) where odds ratio for Nurses is 0.87 (0.7-1.1) and for clinical Assistants is 0.77(0.6-1.0). Also for clinical Assistants, increase in net monthly pay, OR= 0.88 (0.7-1.3) indicate effect on increasing chances of choosing the rural job. It is also indicated that, both training and net monthly pay do notindependently explain the model (P-value is 0.31) which is not statistically significant at 5% confidence level. The same trend is observed with the level of education, where both respondents with form four and form six secondary education, gave more weight to training, OR=0.85 (0.7-1.1) and 1.5- 0.67 (0.4-1.0) respectively, compared to other four job attributes. This implies that, form four ware 1.14 and from six leaversware 1.5 more likely to choose a rural job after training. However, the attributes are not statistically significant at 5% confidence level. Additionally, Form Six leavers have shown

to be more likely to choose a rural jobs by 1.14, given an increase of monthly pay from TShs.269,000.00 to 362,000.00, odds ratio= 0.88 (0.6-1.3).

Table 5(b) shows that male and females have almost similar preference in choosing the five job attributes, with exception of training, where males ware 1.25 more likely to choose the rural job in exchange of further training, while females ware 1.1 more likely to choose the rural job because of good leadership and management.

Table 5(b): Choices of attributes of different sub-groups of respondents basing on social demographic factors

Model	Variables (Attributes) Net Monthly Pay	Housing-Basic	Training-Upgrading	Drugs and Supplies	Leadership& Management
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
Sex					
Male	0.92(0.8-1.1) (0.46)	0.94(0.8-1.2) (0.54)	0.8 (0 .6-1.0) (**0.048**)	0.94(0 .8-1.2) (0.54)	0.97(0.8-1.2) (0.75)
Female	0.94(0.8-1.1) (0.51)	0.95(0.8-1.2) (0.65)	0.89 (0.7-1.1) (0.34)	0.93(0.8-1.1) (0.48)	0.94(0.8-1.2) (0.58)
Age					
<20 yrs	1.0(0.5- 2.0) (0.93)	1.0(0.5- 2.0) (0.93)	1.0(0.5-2.3) (0.96)	1.1(0.6-2.1) (0.81)	0 .96(0.5-1.9) (0.96)
20 - 29 yrs	0 .93(0.8 -1.1) (0.311)	0.94(0.8-1.1) (0.39)	0 .82 (0.7- 1.0) **(0.031)**	0 .92(0.8-1.1) (0.29)	0.95(0.8-1.1) (0.51)
Marital Status					
Married	0.91(0 .5-1.6) (0.74)	0.94(0.5-1.6) (0.83)	0.85(0.5-1.6) (0.58)	0.94(0.5-1.6) (0.81)	0.94 (0.5-1.6) (0.81)
Not married	0.94 (0.8-1.1) (0.37)	0.95(0.8-1.1) (0.45)	0.83(0.7-1.0) **(0.044)**	0.93(0.8-1.1) (0.36)	0.95(0.8-1.1) (0.53)
Children					
YES	0.95 (0.6-1.5) (0.79)	1.04(0.7-1.6) (0.85)	1.0 (0.7-1.6) (0.97)	1.0(0.7-1.5) (0.97)	0.94(0.6- 1.5) (0.78)
NO	0.93(0.8-1.1) (0.36)	0.93(0.8-1.1) (0.35)	0.81(0.7-1.0) **(0.022)**	0.92(0.8-1.1) (0.28)	0.95(0.8-1.1) (0.54)
Religion					
Christian	0.92(0.8-1.1) (0.30	0.94(0.8-1.1) (0.44)	0.82(0.7-1.0) **(0.026)**	0.92(0.8-1.1) (0.291)	0.94(0 .8-1.1) (0.45)
Moslem	1.0 (0.6-1.6) (0.99)	1.0(0.6-1.6) (0.91)	1.1(0.6-2.1) (0.79)	1.1(0.6-1.8) (0.78)	1.0 (0.6-1.7) (0.89)

Odds ratio estimated at 95% Confidence interval

*4.3 **Ranking of the Attributes***

Apart from the ranking the attributes by using DCE method, respondents were also asked to rank the same attributes using simple ordering method. In the later method, they were

asked to choose any three attributes in the descending importance, by writing the most important attribute first and the least being number three. The result of this exercise are shown in Table 6, where for the simple ordering ranking, pay increase was the most preferred, while through DCE access to further training was ranked first. Furthermore, in DCE provision of basic housing was the lowest and in simple rank ordering, good leadership and management, was the lowest. However comparing the two ordering methods using a Wilcoxon signed-rank test, two rankingmodel are statistically not different, P-value = 0.1573 which is greater than 0.05.

Table 6:Rank ordering of the attributes in simple rank ordering and the DCE method

Attributes	Simple Order Ranking	DCE Ranking
Pay Increase	1	2
Access to Further Training	2	1
Availability of Drugs, Equipments and Medical Supplies	3	2
Provision of Basic Hosing	4	3
Good Leadership and Management	5	2

Wilcoxon signed-rank test, observed P Value = 0.1573

CHAPTER FIVE

5 DISCUSSION

5.1 ***Introduction***

This study was designed to investigate the incentive (attributes) package that attracts Low Level trained health workers in rural areas. The study employed the DCE framework to consider various low level trained health workers preference in weighing competing scenarios in choosing place of work, between rural and urban areas

5.2 ***Choice of Rural Jobs by Low Level Trained Health Workers***

In this study, five attributes to elicit preference for rural jobs (increase in net monthly pay, provision of basic hosing, provision of training, availability of medicines and supplies and good leadership and management) have been studied.The results have shown that, provision of training for upgrading purposes had greater chance of influencing selection of rural jobs by 1.2 more times than urban job. It means that, provision of further training to this group would significantly influence the willingness to work in the rural areas. These results corroborates another study that was done in Tanzania by Kolstard (2011), where she looked at the preference of the Clinical Officers to work in rural areaand found that, training for upgradingalone significantly influenced the choices of the rural job. However, combining this attributes with others like increase in net monthly pay, provision of training, availability of medicines and supplies and, good leadership and management increases chances of selecting the rural jobs, as literature asserts, to the fact that combination of job attributes have greater effect in attracting people to particular job placement (Dielemann, et al., 2003; Manongi et al., 2007; Vujicic et al., 2004; Willis-

Shattuck et al., 2008). Result of this study shows that the lower level carders have different preference compared to higher level carders (doctors and nurses), where in the formergroup the main factor is upgrading in their career, while in later the other job attributes come into effect, such as housing, availability of medicines and supplies as well as good pay. This argument is supported by the similar study in Ghana, which was conducted among fourth year medical students. In this study, Kruk et al (2010) found that, rural job attributes (improved infrastructure and equipment) that allowed medical student to carry out well their clinical practice and achieve professional growth; were approximately as much as a doubling of their starting salary. Similar results are also observed in another DCE study in Ethiopia among Doctors and Nurses, whereavailability of equipment was crucial for attracting health workers in rural areas (Hanson and Jack, 2010). Furthermore, Mangham and Hanson (2008) in a study of employment preferences of public sector nurses in Malawi revealed that, most nurses were willing to tradeoff among attributes, where opportunities to upgrade professional qualifications and government housing had the greatest impact on nurses' employment between lower and higher carders. Also, it is not surprising that training becomes stronger factor for attracting lower level health workers in rural areas due to the fact that, it provides future economic returns, where upon upgrading the salaries will increase thus compensating for all other four job attributes (Blaauw et al., 2010)

Subgroups within the Low Level trained health workers, basing on cadre and social demographic factors revealed almost similar preference as the main model, where provision of further training appeared to significantly affecting the choicesfor: rural residents, Christians, not married, having no child, Age= 20-29 and Males. This implies

that, if promised further training, they would accept rural jobs. Conversely, those with an age group less that 20years, those with children and of Moslem denomination had odds ratio almost or equal to one for all five job attributes presented in the DCE experiments. This signifies that, they had a more preference for urban jobs compared to rural ones. These results augment the existing evidence that,different factors e.g. social demographic factors, beyond the main job attributes influences how people select job placements(Chomiz et al, 1998; Dussault and Franceschini, 2006; Serneels *et al*., 2007).Thus, the results of this study highlight the importance of policy makers to consider interests of different groups when designing the attraction package for specific job locality.

*5.3 **Minimum Incentive Package for Low Level Trained Health Workers***

The results of this study suggest minimum incentive package to attract Low level trained health workers in the rural area is important. The ranking of the attributes through both simple ordering and the DCE using Wilcoxon signed rank test, found that raking of the attributes had a similar weights to the attributes (P-value = 0.1573). The difference was not statistically significant, thus if the policy makers are to choose one attribute to attract Low Level trained health workers to work in the rural areas, provision of up-grading training would be the most preferred policy action. However, body of evidence shows that combination of incentive have greater impact, thana single incentive, especially when pecuniaryincentives are combined with non-pecuniary (Dielemann, et al., 2003;Vujicic et al., 2004; Willis-Shattuck et al., 2008). Manongi et al., (2007), observed similar findings in a study conducted in Northern Tanzania. Multiple cadres of health staff working in

government primary health care facilities, from nurse auxiliary to assistant medical officer, were invited to contribute to the investigation. It was concluded from this study that, both financial and non-financial incentive need to be applied together for better outcome in terms of attraction, retention and motivation of health workers, particularly for those working in rural and remote areas. Thus basing into this fact and the result of this study it will be nice to consider increase in salary, but for this specific group, it should be beyond TSh. 362,000.00, as it did not come independently significant in the DCE results under the binary logit model. The third option will be to consider improving the working condition, where availability of Medicines and other supplies becomes adequate at the health facilities, where Low level trained health workers will be posted in the rural areas.

5.4 Workforce Motivation Theories and the study results

Chapter three of this studyhas discussed three key motivational theories, namely: First, Neoclassic Wage Theory exemplified Taylor and Scientific Management, which suggests that, the choice is driven largely by financial motives (Halfacree, et al., 1998) and by the probability of finding employment (Tadaro, 1976). Second, the Maslow model (the hierarchy of needs).Third,Hertzberg's two factor model (hygienic and motivators). Examples of hygienic factors include: company policy and administration; wages, salaries and other financial remuneration, working conditions and feelings of job security. While the motivator factors include: status, opportunity for advancement, gaining recognition, responsibility, challenging work, sense of personal achievement and personal growth in a job.

The result of this study reinforces these prominent theories, as shown from the results in table 4 & 6. Analysis of the respondent showed that, upgrading training being the most significant factor for the selection of rural job. This is explained by the fact that, if they get upgrading training, they expect to move to higher level within the career ladder, thus gaining higher status as well as increased economic returns in the longer term. This is in congruent with both theoriesas put forward by: Taylor, were economic gains being was the most important factor; Herzberg on status, opportunity for advancement, gaining recognition, responsibility, challenging work, sense of personal achievement, personal growth in a job and pay. Also for Maslow, moving along the hierarchal ladder, from physical needs to self-actualization, achieved through upgrading in the careers as well pay.

*5.5 **Limitations of the Study***

This study has several limitations (also called extraneous variables), which include:

First the hypothetical nature of the job scenarios presented to the respondent, thus it may not represent reality and thus reduce concentration and seriousness of the respondent while selecting the choices. However the attributes were selected in such way that they are closely related to actual situation on the ground. Also respondent were advised to be as much objective as possible while making their choices.

Second, the complex nature of the DCE design which translates into the length of the questionnaire, which may results into boredom while filling the DCE tool. This was taken care from the design stage, where by half factorial design was used as well as limiting the number of attributes and levels to the minimum possible without compromising the quality

of information needed to be extracted from the respondent, i.e. the design is an orthogonal array. Usually literature asserts to less than 18 pairs as the boredom threshold (Mangham et al 2009).

Third, any inferences made on the basis of these results apply only to students who are nearly to graduate and expecting to work, not to those already in practice. As it appears that, these two groups may differ in their preferences for rural practice (Hanson& Jack; 2010 and Serneels et al., 2007). It should be noted that this study addresses the attraction and not retention that is why it focuses on the final year students who are near to graduate.

CHAPTER SIX

6 CONLUSION AND RECOMMENDATION

6.1 ***Conclusions***

This study has quantified the relative importance of the selected job attributes namely: provision of training for upgrading, increase in net monthly pay, availability of medicines and other supplies, and provision of basic housing, in relation to Low Level trained health workers preference for rural posting.Ranking of the attributes through simple ordering and the DCE were statistically similar, thus providing a fair means of quantifying the attributes.

Thus from this study is concluded that;

i. Minimum incentive package to attract Low level trained health workers in the rural area is important
ii. Provision of further training is independentlysignificant attribute, and it becomes the most important single choice in order to elicit Low Level trained health workers preference for rural areas.
iii. Subgroups within the Low Level trained health workers have different choices among the five job attributes presented in this study,with provision of training being the most prominent choice
iv. Students who reside in rural areas have shown strong desire to choose rural jobs in exchange for the upgrading training.

v. Combination of financial and non-financial incentives may increase chances of attracting Low Level trained health workers to take rural jobs.

vi. Financial incentives, such net monthly pay should have a substantial difference with the current base salary to get effect of trade off for rural job

vii. Results of study are in line with Maslow's theory of hierarchical of needs and the Herzberg's two factor theory

6.2 ***Recommendations***

The following recommendations are made basing on the finding from this study:

i. Policy makers should provide incentivepackages tailored to specific group of health worker as same job attributes elicits different choices for each sub-group within the Low level trained health workers.

ii. Ministry of Health & Social Welfare should provide of upgrading training for Low Level trained health workers, which may have substantial influence to their attractiveness to rural jobs in Tanzania.

iii. Ministry of Health Social Welfare should consider special program to promote training of students who come from rural areas as they have shown strong willingness to work in rural areas in exchange for provision of upgrading training opportunity.

iv. Further study should be done to get detailed understanding of other factors that may influence choices made by Low Level trained health workers to work in rural areas

7 REFERENCES

Bennett S, Gzirishvili, D. &Kanfer, R. (2000): An In-Depth Analysis of the Determinants and Consequences of Worker Motivation in Two Hospitals in Tbilisi, Georgia. Major Applied Research 5, Working Paper 9. Bethesda, Maryland: Partnership for Health Reform Project.

Blaauw, B., Erasmus, E., Pagaiya, N., Tangcharoensathein, V., Mullei, K., Mudhune, S., Goodman, C. et al, (2010). Policy interventions that attract nurses to rural areas: a multicounty discrete choice experiment.Bulletin of the World Health Organization 2010; 88:350-356.

Buchan, J.&Calman L. (2004). The global shortage of registered nurses: An overview of issues and actions. Geneva, Switzerland: International Council of Nurses (ICS)

Buchan, J.& Dovlo D. (2004). International recruitment of health workers to the U.K. a report for DFID London: DFID Health System Resource Centre.

Bundred, P. E. &Levitt, C. (2000). "Medical Migration - who are the real losers? *The Lancet 356: 245-246*

Canadian Nursing Advisory Committee (CNAC) (2002). *Final Report of ANAC on the National Nursing Strategy.*

Census (2002). National census report. Tanzania National Beural of Statistics.

Chen L, Evans T, Anand S, Boufford JI, Brown H, Chowdhury M, Cueto M, Dare L, Dussault G, Elzinga G, *et al*. (2004). Human resources for health: overcoming the crisis. *Lancet*, 364(9449):1984-1990

Chomitz, K. M., Setiadi G., Azwar, A., Ismail, N.&Widiyarti. (1998). What do doctors want? Developing incentives for doctors to serve in Indonesia's rural and remote areas. World Bank Working Paper Series, 1888. Washington, DC: World Bank.

Dovlo, D. (2003). The brain drain and retention of health professionals in Africa. A case study prepared for the Regional Training Conference: Improving Tertiary Education in Sub-Sahara Africa: Things That Work; 22-25 Sep; Accra, Ghana

Dielemann, M., Viet Cuong P, Vu Anh L &Martineau T., (2003): Identifying factors for job motivation of rural health workers in North Viet Nam. *Human Resources for Health* 2003, 1:1-10.

Dominick, A. & Kurowski, C. (2005). Human Resources for Health - an Appraisal of the Status Quo in Tanzania Mainland

Dovlo, D.& Marteau, T. A review of migration of Africa's health professionals. JLI Working Paper4-4. Joint Learning Initiative, Global health Trust, 2004.

Dussault, G &Franceschini, M.C. (2003). Not enough here, too many there: Understanding geographical imbalances in the distribution of health personnel". Washington DC, the World Bank Institute.

Ferrinho, P. & Dal Poz, M. (2003). Towards a global health workforce strategy. *Studies in Health Organization and Policy, 21*. Antwerp: ITG Press

Habte, D., Dussault G. &Dovlo, D. (2004). Challenges confronting the health workforce in Sub-Saharan Africa. World Hospitals and Health Services; 40(2):23-6,40-1

Hanson, K. &Jack, W. (2010). Incentives Could Induce Ethiopian Doctors And Nurses To Work In Rural Settings. Health Aff. vol. 29 no. 8 1452-1460.

Harries, A.D., Hargreaves, N. J., Gausi, F., Kwanjana, J.H. & Salaniponi, F.M.(2002). "High death rates in Health care workers and teachers in Malawi". *Trans R Soc Trop Med Hyg 96(1): 34-7)*

Hospian, A., Thompson, M., Fordyce, M., Johnson K.E. &Hart G. (2004). The migration of physicians from Sub-Sahara African to the United States of America: Measures of African brain drain. *Human Resource for Health,*

Huddart, J. &Picazo O. The health sector human resource crisis in Africa: an issue paper. Washinton D.C: SARA Project, AED; USAID, 2003

Hall, J. & Viney, R., Haas, M. & Louviere, J. J. (2004). Using stated preference discrete choice modelling to evaluate health care programs. Journal of Business Research 57: 1026–32.

Kruk, ME., Johnson, J. C., Gyakobo, M., Agyei-Baffour, P., Asabir, K., Kotha, SR., Kwansah, J., Nakua, E., et al (2010). Rural practice preferences among medical students in

Ghana: a discrete choice experiment. *Bulletin of the World Health Organization* 2010;88: 333-341. doi: 10.2471/BLT.09.072892

Kingma, M. (2003). Economic incentive in community nursing: attraction, rejection or indifference? *Human Resources for Health* 2003, 1:2

Kokur, G., Alder, T., Hyman, W. & Aunet, B. (1982). Guide to Forecasting Travel Demand with Direct utility Assessment. United States Department of Transportation, Urban Mass Transportation Administration, Report UMTA-NH-11-0001-82-1, Washimgton DC

Kolstad, J.R. (2011). How to make rural jobs more attractive to health workers. Findings from a discrete choice experiment in Tanzania. Health Econ. 20(2):196-211.

Kurowski, C., Wyss, K., Abdulla, S., Yémadji, N., &Mills, A. (2004). Human resources for health: Requirements and availability in the context of scaling-up priority interventions in low-income countries. Case studies from Tanzania and Chad: London School of Hygiene and Tropical Medicine.

Louviere, J., Islam,T., Wasi,N., Street, D &Burgess, L. (2008). Designing discrete choice experiments: do optimal designs come at a price?. Journal of Consumer Research, 35:360–376.

Lancsar, E. &Louviere, J. (2008). Conducting discrete choice experiments to inform healthcare decision making: a user's guide. Pharmacoeconomics, 26(8): 661–677.

Lehmann, U. &Sanders, D. (1999). Chapter 15: The production of doctors. In N. Crisp (Ed.), *South African Health Review 1999* (pp. 187-200). South Africa: Health Systems Trust.

Louviere J, Hensher D. A. &Swait J. D. (2000). Stated choice methods: analysis and application. Cambridge: Cambridge University Press.

Louviere, J., & Lancsar, E. (2009). Choice experiments in health: the good, the bad, the ugly and toward a brighter future. Health Economics, Policy and Law (2009), 4: 527–546.

Mangham, L.J. &Hanson, K. (2008).Employment preferences of public sector nurses in Malawi: results from a discrete choice experiment.Trop Med Int Health.2008 13(12):1433-41.

Mangham, J. L., Hason, K., & McPake, B. (2009). How to do (or not to do) . . . Designing a discrete choice experiment for application in a low-income country. Health Policy and Planning 2009;24:151–158

Manongi, R.N., Marchant, T.C. & Bygbjerg, I. C. (2006). Improving motivation among primary health care workers in Tanzania: a health worker perspective. Hum Resour Health. 2006; 4: 6

Martineau T., Lehmann U., Kathyola J., et al, (2006). Factors affecting retention of different groups of rural health workers in Malawi and Eastern Cape Province, South Africa" Final report.

Mathauer, I. & Imhoff, I. (2003). Staff motivation in Africa: the impact of non-financial incentives and quality management tolls; a way to retain staff. Eschborn, German: GTZ,

Matsiko, C.W. & Kiwanuka, J. (2003). A review of human resource for health in Uganda. *Health Policy and Development, 1* (1), 15-20.

Narasimhan, V., Brown, H., Pablos-Mendez, A., Adams, O., Dussault, G., Elzinga, G., Nordstrom, A., Habte, D., Jacobs, M., Solimano, G., Sewankambo, N., Wibulpolprasert, S., Evans, T., & Chen, L. (2004). Responding to the global human resources crisis. *The Lancet, 363,* 1469-1472.

Serneels, P., Lindelow, M., Montalvo, J.G. & Barr, A. (2007). For public service or money: understanding geographical imbalances in the health workforce. *Health Policy Plan* 2007; 22: 128-38.

Standing H. &Baume E. (2000). Equity, equal opportunities, gender and organization performance. Workshop on Global Health Workforce Strategy; 9-12 Dec 2000; Annecy, France.

Street, D. A. &Burgess, L. (2004). ‘Optimal and near-optimal pairs for the estimation of effects in 2-level choice experiments. Journal of Statistical Planning and Inference, 118: 185–199.

Street, D. A., L. Burgess &Louviere, J.J. (2005). ‘Quick and easy choice sets: constructing optimal and nearly optimal stated choice experiments’, International Journal of Research in Marketing, 22(4): 459–470.

Street, D. A. & Burgess, L. (2004). ‘Optimal and near-optimal pairs for the estimation of effects in 2-level choice experiments. Journal of Statistical Planning and Inference, 118: 185–199.

Street, D. A., L. Burgess & Louviere, J.J. (2005). ‘Quick and easy choice sets: constructing optimal and nearly optimal stated choice experiments’, International Journal of Research in Marketing, 22(4): 459–470.

Tay, L. &Diener, E. (2011). Needs and subjective well-being around the world. *Journal of Personal Social Psychology*, 101, 2, 354-65.

Reid, S. (2004). Monitoring the Effect of the New Rural Allowance for Health Professions. Durban: Health Systems Trust.

USAID (2006). Retention of Health Care Workers in Low-resource Settings: Challenges and Responses Capacity project, knowledge sharing

U.S. Department of Health and Human Services (DHHS). 2002. *Projected Supply, Demand, and Shortages of Registered Nurses;* 2000-2002, Health Resource and Services Administration, Bureau of Health Professions.

WHO (2005). Human Resource for Health: toolkit for planning training and management. Geneva, Switzerland: World health Organization, 2005.

Vujicic, M., Zurn, P., Diallo, K., Adams, O.&Dal Poz, M. (2004). The role of wages in the migration of health care professionals from developing countries. *Human Resources for Health* 2004, 2:3.

WHO, 2006. World Health report, 2006: Working together for health. Geneva, W*HO*

Yumkella, F. (2005). Retention: health workforce issues and response actions in lower-resource settings. Capacity resource paper, ItraHealth International Inc.

Wyss, K. (2004), Scaling-up Anti-retroviral Treatment and Human Resources for Health: What are the challenges in Sub-Saharan Africa" Swiss Tropical Institute.

Zaidi, A. (1996). Why medical students will not practice in rural areas: evidence from a survey. *Social Science and Medicine* 22, 527-533.

Zurn, P., Dal Poz, M., Stilwell, R. & Adams,O. (2004). "Imbalance in the health workforce" *Hum Resour Health 2(1)*

8 APPENDICES

*8.1 **Appendix 1 : Informed consent Form***

MUHIMBILI UNIVERSITY COLLEGE OF HEALTH SCIENCES DIRECTORATE OF RESEARCH AND PUBLICATIONS.

INFORMED CONSENT

ID-NO ☐☐☐

Consent to participate in this study

Greetings! My name is ……..…….. I am working on this research project with the objective of determine the most important incentives that appraising the possibility of low level trained health workers to work in rural areas. Thus Clinical Assistants and the Nurses students in their final year of study will be interviewed from selected schools in Tanzania.

Purpose of the study

This study has the purpose of collecting information about Low level Trained Health Workers respond to known job attributes, while they make choices and preference for particular location to work and how they weigh the relative importance of different

incentives, while eliciting their choices for particular place; particularly their attraction to rural and remote areas.

What Participation Involves

If you agree to participate in this study the following will occur:

1. You will be given a questionnaire, and requested to answer all question.
2. No identifying information will be collected from you during this interview, except your age, level of education, marital status.
3. You will be interviewed only once for approximately 20 minutes in a private setting.

Confidentiality

I assure you that all the information collected from you will be kept confidential. Only people working in this research study will have access to the information. We will be compiling a report, which will contain responses from several clients without any reference to individuals. We will not put your name or other identifying information on the records of the information you provide.

Risks

You will be asked questions about the effect of ARV on body functioning and the social economical cost you are facing. Some questions could potentially make you feel uncomfortable. You may refuse to answer any particular question and may stop the interview at any time.

Rights to Withdraw and Alternatives

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits

The information you provide will help to increase our understanding on what is important among job attributes when it comes to choice of place of work and inform the policy makers on future strategies to improve incentives to low level heath workers in Tanzania

In Case of Injury

We do not anticipate that any harm will occur to you or your family as a result of participation in this study.

Who to contact

If you ever have questions about this study, you should contact the study Coordinator or the **Principal Investigator, Tumaini N. Mikindo,** Muhimbili University of Health and Allied Sciences (MUHAS), P.O. Box 65001, Dar es Salaam (Tel. no. 0754 370000). If you ever have questions about your rights as a participant, you may call **Prof. M. Abud Chairman of the College Research and Publications Committee,** P. O. Box 65001, Dar es Salaam. Tel: 2150302-6 and **Prof. Phare M. Mujinja who is the supervisor** of this study

Signature

Do you agree?

Participant Agrees [__]

Participant disagree [__]

I _____ have read/understood the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of Participant_____

Signature of witness (if participant cannot read)_____

Signature of research assistant_____

Date of signed consent_____

8.2 Appendix 2: DCE Questionnaire

Part A: DCE Experiment				
Experiment No. 1				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Not provided		Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 2				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 3				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 4				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 5				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 6				
Type of Incentive		Job A		Job B
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 7				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 8				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 290,000/=		TShs. 362,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 9				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 10				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 11				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 12				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Not Provided		Provided
Training (Upgrading)		Provided		Not Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 13				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 14				
Type of Incentive		Job A		Job B
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Inadequate		Adequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 15				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Poor		Good
Which one do you choose (Please Mark √ on Selected JOB)				

Experiment No. 16				
Type of Incentive		**Job A**		**Job B**
Net Monthly Pay		TShs. 362,000/=		TShs. 290,000/=
Housing (Basic)		Provided		Not Provided
Training (Upgrading)		Not Provided		Provided
Equipments and Drugs		Adequate		Inadequate
Leadership and management		Good		Poor
Which one do you choose (Please Mark √ on Selected JOB)				

Part B: Raking of the Attributes		
Of the following incentives below:		
1. Pay Increase	2. Provision of Housing	3. Access to further Training
4. Availability of Equipments and Drugs	5. Good Human Resources Management System	
Choose three most important incentives that will determine your placement in rural working station (Rank them as most important being number 1 and least important being number 3). Fill your answers in the space below:		
1		
2		
3		

Part C: Personal information			
Age (in years)(Please √ where appropriate)	**< 20**		
	20-39		
	30-39		
	40-49		
	50-59		
	60-69		
	70-79		
	Other; mention		
Sex (Please √ where appropriate)	**Male**		
	Female		
Marital status (Please √ where appropriate)	**Married**		
	Not married		
Do you have Children	**YES**		
	NO		
	If YES, how many		
Education level (Please √ where appropriate)	**Primary**		
	Secondary Form Four		
	Secondary Form Six		
	Others; mention		
Work position(if working)(state)			

Religion (Please √ where appropriate)	**Christian**		
	Traditional		
	Muslim		
Place of residence	**Rural**		
	Urban		