Lessons Learned from Task Shifting for ART
Could it be Applied to Diabetes Mellitus Therapy in Sub-Saharan Africa?

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Lessons Learned from Task Shifting for ART: Could it be applied to Diabetes Mellitus Therapy in Sub-Saharan Africa?

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<thead>
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>ARV</td>
<td>Anti-retroviral</td>
</tr>
<tr>
<td>ART</td>
<td>Anti-Retroviral Treatment</td>
</tr>
<tr>
<td>CCM</td>
<td>Chronic Care Model</td>
</tr>
<tr>
<td>CHWs</td>
<td>Community Health Workers</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
</tr>
<tr>
<td>DBP</td>
<td>Diastolic Blood Pressure</td>
</tr>
<tr>
<td>DM</td>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>ECSA-HC</td>
<td>East, Central and Southern African Health Community</td>
</tr>
<tr>
<td>HCT</td>
<td>HIV Counselling and Testing</td>
</tr>
<tr>
<td>H/F</td>
<td>Health Facility</td>
</tr>
<tr>
<td>HIIK</td>
<td>Heidelberg Institute for International Conflict Research</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>LHWs</td>
<td>Lay Health Workers</td>
</tr>
<tr>
<td>LMICs</td>
<td>Low and Middle Income Countries</td>
</tr>
<tr>
<td>LTFU</td>
<td>Lost to Follow-up</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>NCDs</td>
<td>Non-Communicable Diseases</td>
</tr>
<tr>
<td>NPCs</td>
<td>Non-Physician Clinicians</td>
</tr>
<tr>
<td>NPHW's</td>
<td>Non-Physician Health Workers</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>PLHIV</td>
<td>People Living with HIV</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized Control Trial</td>
</tr>
<tr>
<td>RR</td>
<td>Relative Risk/ Risk Ratio/ Rate Ratio</td>
</tr>
<tr>
<td>SBP</td>
<td>Systolic Blood Pressure</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>UHC</td>
<td>Universal Health Coverage</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
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</table>
Abstract

Introduction: Sub-Saharan African (SSA) countries face continuous shortages of health workers and with the double burden of communicable and non-communicable diseases, and are exacerbated further by conflicts. In 2014, there were about 22 million individuals with diabetes and 62.5% remain undiagnosed and expected to increase by 100% in 2030. However, lessons can be learned from task shifting for ART to ease the health workers shortage for NCDs.

Objective: To explore the lessons that can be learnt from task shifting for ART that could be applied to non-communicable chronic diseases with the focus on diabetes mellitus in SSA.

Methodology: The research relied on literature reviews from peer-reviewed journals, reports, and grey literature from SSA and similar settings and was collected from the internet.

Lessons learned: The task shifting strategy proved to be efficient for ART and there is evidence with the positive health outcomes. The main lessons learned that could be applied to diabetes mellitus are the need to strengthen and reorganize health services which includes trainings, regular supervisions, a continuous supply of logistics and funding, adjustment of the health policy framework to support the shifting of tasks, standardized and simplified regimens, protocols and guidelines, community and patient empowerment, decentralisation and a referral system.

Conclusions: Task-shifting is a viable model to respond to health workforce crises and could be clinically effective for the management of diabetes. However, task shifting should be combined with the strengthening of health services, training and enabling policy frameworks. In addition, most of the studies have been carried out so far are small and mainly observational, more of longer duration are needed to explore the evidences in each task-shifting model.

Key words: task shifting, ART, non-physician clinicians, non-communicable disease, diabetes mellitus, lessons learned and Sub-Saharan Africa.
1. Introduction
The Director General of the World Health Organization (WHO), Dr Margaret Chan, in the preface of task shifting guidelines, she noted that task shifting strategy boosts the objectives of health services that are accessible, equitable and of good quality. Task shifting provides access of care to all people in an effective and sustainable manner. She recognises that task shifting is a precursor for the renewal of primary health care (PHC) (WHOa, 2008).

The WHO defines task shifting as “the rational redistribution of tasks among health workforce teams. Specific tasks are moved, where appropriate, from highly qualified health workers to health workers with shorter training and fewer qualifications in order to make more efficient use of the available human resources for health” (WHOa, 2008, p. 2). Task shifting should be implemented in parallel with other human resource strategies and should not be regarded as replacement for other human resources for health. The tasks that are to be shifted should be determined according to the health needs of local community as well as health workers’ skills and delivery models. The WHO and other humanitarian organisations have widely promoted the task-shifting strategy. In order for task shifting to be successful, it requires simplified guidelines and protocols, pre-services and on the job training with continued supervision as well as legal protection of health workers (WHOa, 2008; Hischhorn et al. 2006).

1.1 Problem Statement and Research Questions
Globally, 56 million deaths occurred in 2012. Out of that 38 million or 68% were due to Non-communicable Diseases (NCDs), consisting largely of cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. About 74% of the total death from NCDs occurs in low-and middle-income countries (LMICs). However, in Africa, there are still more deaths from infectious diseases than NCDs. Nevertheless, the incidence of NCDs is rising rapidly and is projected to cause almost 75% as many deaths as combined communicable, maternal and nutritional diseases by 2020. In Africa NCDs will cause about 3.9 million deaths by 2020 (WHOa, 2010, 2014). According to the projection done by Kearney et al (2005) the global burden of hypertension will rise from 639 million in 2000 to 1.15 billion in 2025 in economically developing countries, including Sub-Saharan Africa (SSA). The prevalence of diabetes is projected to rise by 50% globally and by 100% in SSA between 2010 and 2030 (Stuckler, D., 2008). Globally in 2014, it was estimated that 387 million people were living with diabetes. Out of the total number of people suffering from diabetes, 77% are living in
low and middle-income countries. Just in SSA, in 2014, there were about 22 million individuals with diabetes out of which 62.5% were undiagnosed (IDF Diabetes ATLAS, 2014).

Shortage of human resources for health negatively affects delivery of health services in low and middle-income countries (LMICs) in general and in SSA in particular. Out of 57 countries that are identified by WHO to have an acute health workforce crisis, 36 are in SSA and the majority of them are in conflict or in post conflict situations. The problem is not limited to inequitable distribution between countries but within country as well. In countries facing a humanitarian crisis, health systems often are either lacking or under threat of collapse. Countries in conflicts disproportionately at risk of infectious and non-infectious diseases are in greater need of health provision than non-crisis countries (Janneck L. et al, 2009; Roome E. et al, 2014; WHO, 2006).

Sub-Saharan Africa has 24% of the global disease burden while it only has 3% of the global health workers. The limited workforce combined with the rising burden of non-communicable chronic diseases poses further challenges. The double burden hampers the attainment of the health-related Millennium Development Goals, and economic growth. The human resources shortage in SSA cannot respond to the growing demand caused by chronic NCDs and infectious diseases (WHOb, 2008, p. 6). It becomes essential to use the limited resources available in the most effective and efficient way and demands innovative approaches to expand rapidly the number of health workers (WHOb, 2010; Lekoubou A. et al, 2010, p. 354).

The human resources gap particularly in rural areas, demands task shifting to lower health cadres and community health workers (CHWs) in order to address shortage of health professionals and to improve access. Task shifting is one of the solutions that is endorsed by WHO to address the problem (WHO, 2006). The availability of ARV (anti-retroviral) drugs to treat HIV and AIDS brought about major changes in the health system, as chronic diseases received attention for the first time (van Olemen J. et al, 2012 p. 1). Task shifting among health workers for ART (Anti-retroviral treatment) intervention has been implemented in SSA for years now. There is a large amount of evidence in the relevant literature that task shifting strategy for ART increases access and produces the same health outcomes as physicians-led health care. However, there is little data from task shifting for diabetes mellitus and it is less
clear if the lessons learned from task shifting for ART could be applicable for non-communicable chronic diseases with a focus on diabetes mellitus.

The large body of research on task shifting for ART showed good health outcomes and is cost effective. These lessons learned could be relevant to the treatment of non-communicable chronic diseases particularly diabetes mellitus in non-crisis and humanitarian settings. The thesis has four chapters including the introduction, the lessons learned from task shifting for ART, evidence on task shifting for NCDs and the last chapter is discussions and conclusions.

The purpose of this paper is to identify the lessons learned from task shifting for ART that could be applied to non-communicable chronic diseases with a focus on diabetes mellitus in SSA countries. This paper answers the following questions:

1. What are the lessons learned from task shifting for ART in Sub-Saharan African Countries?
2. Can we apply the lessons learned from task shifting for ART, to non-communicable chronic diseases in particular diabetes mellitus?

1.2 Methodology
This paper relied on literature reviews from peer reviewed journals, reports, and grey literature, which was collected from the internet using search engines such as PubMed, Google Scholar, Medline and the Cochrane library. The websites of MSF, WHO, UNAIDS, UNICEF and other health related organisations also provided useful sources of information for this paper. The search was done using the following terms: task shifting, task sharing, HIV and AIDS, non-physician clinicians, primary healthcare teams, cadres, antiretroviral treatment, community support, lay community health workers, humanitarian crisis, humanitarian settings, resource-limited countries and nurse led ART, non-communicable disease, diabetes, lessons learned, Sub-Saharan Africa.

The search was limited to material in the English language and to Sub-Saharan Africa due to these countries being more affected by HIV and AIDS and the region has a rapidly increasing burden of non-communicable diseases including diabetes mellitus.

This paper is focused on diabetes mellitus. The diabetes mellitus case is chosen from other non-communicable diseases, because it is one of the major burdens among NCDs in SSA. Diabetes mellitus is rapidly increasing in SSA countries due to urbanization, lifestyle changes and epidemiological transitions. In addition, HIV and diabetes have some chronicity
commonalities which requires continuity of care for life, self-management, adherence and community and social support.

2. Lessons learned from Task Shifting for ART
This chapter presents the lessons learned in responding to ART care in Sub-Saharan Africa. It comprises task shifting models for ART, impact of task shifting for patients, community-based approach, cost-effectiveness of task shifting strategy, perception, attitude and behavior of health workers and conditions for task shifting.

2.1 Task Shifting Models for ART
Figure 2.1: Task shifting: expanding the pool of human resources for health

Four types of task shifting have been commonly seen in SSA. Task shifting I, from physicians to health/clinical officers. Task shifting, II from physicians or clinician officers to nurses/nurse assistants Task shifting type III from nurses to nurse assistants or lay community health workers. And task shifting IV, from physicians or other non-clinicians health workers to HIV patients.

Source: WHO, 2007

In type II task shifting, nurses take on clinical tasks such as determining ART eligibility; prescribing drugs, following-up patients, and managing side effects of medications. Trained PLHIV (People living with HIV) are able to screen for symptoms of immune deficiency and be referred to health facilities (HF) (Zachariah R. et al, 2009, p. 549-551).

A WHO commissioned study on task shifting demonstrated that different task shifting types are being implemented in different settings for ART health service delivery. All types of task shifting are being implemented in a variety of combinations in many countries such as Malawi, Ethiopia, Rwanda, Uganda and Namibia. Task shifting for ART care is being
considered in all health care at the tertiary, secondary and primary levels as well as non-facilities based care in communities (WHOa, 2008, P. 38-39).

Task shifting improves the numbers and skills of health cadres in responding to ART care. The types of task shifting can be determined based on community health needs, the gap in the health workers and the model of health delivery.

2.2 Impact of Task Shifting for Patients Health Outcomes

Impact here refers to positive or negative health outcomes of task shifting for a patient living with HIV and AIDS, for example by improving or reducing CD4 counts, reducing or increasing viral load.

Table 2.1: Systematic review: impact of task shifting for patients’ health

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Follow-up</th>
<th>Relative effect (95% CI)</th>
<th>Study size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>RCTs</td>
<td>RR 0.96 (0.82 to 1.12)</td>
<td>2770 (1 study)</td>
</tr>
<tr>
<td></td>
<td>RCTs</td>
<td>RR 0.89 (0.59 to 1.32)</td>
<td>4,332 (2 studies)</td>
</tr>
<tr>
<td></td>
<td>RCTs</td>
<td>RR 1.0 (0.62 to 1.62)</td>
<td>559 (1 study)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>RR 1.23 (1.14 to 1.33)</td>
<td>39,160 (2 studies)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>RR 0.19 (0.05 to 0.78)</td>
<td>2772 (1 study)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>RR 1.44 (0.81 to 2.57)</td>
<td>385 (1 study)</td>
</tr>
<tr>
<td>Lost to follow-up</td>
<td>RCTs</td>
<td>RR 0.73 (0.55 to 0.97)</td>
<td>2,770 (1 study)</td>
</tr>
<tr>
<td></td>
<td>RCTs</td>
<td>RR 1.27 (0.92 to 1.27)</td>
<td>4,332 (2 studies)</td>
</tr>
<tr>
<td></td>
<td>RCTs</td>
<td>RR 0.5 (0.12 to 2.30)</td>
<td>559 (1 study)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>RR 0.3 (0.05 to 1.94)</td>
<td>39,156 (2 studies)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>0.34 (0.18 to 0.66)</td>
<td>2772 (1 study)</td>
</tr>
<tr>
<td></td>
<td>Cohorts</td>
<td>RR 1.49 (0.81 to 2.74)</td>
<td>385 (1 study)</td>
</tr>
</tbody>
</table>

Source: Kredo T. et al 2014

Kredo T. et al (2014) conducted a systematic review of ten studies, including four randomized controlled trials (RCTs) and six cohort studies. The studies included in the systematic review were conducted in SSA from 2007 to 2013. The review evaluated the quality of care of initiation and maintenance of ART by non-physician clinicians and community health workers. There was no difference found in the number of deaths after one year between a doctor-led and a NPHWs ART program, with a risk ratio (RR = 0.96, 0.89, 1.0, 1.23, 0.19 & 1.44). Generally, there was slightly lower loss to follow-up in the task-shifting groups at one
year (see table 2.1). This systematic review also showed that in all the studies there was no difference in virological and immunological outcomes (Kredo T, et al, 2014, p. 2).

Another systematic review of 84 studies for task shifting for ART from SSA organized their findings in terms of five themes: health outcomes, efficiency, access, quality of care and team dynamics. Tasks were shifted to non-physician clinicians such as patients, lay health workers, nurses and medical assistants in facilities and home-based provisions of ART and maintenance. The patients’ health outcomes in terms of mortality, adherence, retention and virological suppression were not significantly different from the physicians ART program. However, there were fewer losses to follow-up in the task shifting groups (Callaghan M. et al, 2010, p. 2-9).

Yet another systematic review of six studies including 19, 767 patients found similar patient outcomes with task shifting from doctors to nurses, from health care professionals to lower health workers and community. However, the systematic review revealed also that most of the identified studies were very small and more evidence is required for each type of task shifting (Mdege N. et al, 2013, p. 1).

Table 2.2. Systematic review of 12 studies: Impact of task shifting strategy on HIV patients.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Relative effect (95% CI)</th>
<th>Study size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>1.05 (CI=0.84-1.28, p= 0.72)</td>
<td>59,666 (9 studies)</td>
</tr>
<tr>
<td>Lost to follow-up (LTFU)</td>
<td>0.72 (CI=0.56-0.94, p=0.31)</td>
<td>53,435 (8 studies)</td>
</tr>
<tr>
<td>CD4 level at the end of 1 year</td>
<td>-2.32 (CI=-17.31 to 12.68, p=0.76)</td>
<td>17,142 (5 studies)</td>
</tr>
<tr>
<td>Viral failure at the end of 1 year</td>
<td>0.89 (CI=0.65 to 1.23, P=0.47)</td>
<td>10,344 (5 studies)</td>
</tr>
</tbody>
</table>


A systematic review of 12 studies was made, including 3 RCTs, 6 cohorts and 3 cross sectional studies. Nine studies were eligible for meta-analysis, comprising 3 randomized and non-randomized trials and 6 cohort studies conducted between 2007 and 2011 in SSA and showed good health outcomes. The meta-analysis found no significant difference in mortality, CD4 level and viral failure between physicians and non-physicians. However, losses to follow-up decreased in the task shifting program (RR = 0.72) and the decentralization of care is likely to be responsible for the reduction in LTFU (lost to follow-up). The systematic review demonstrated that the studies suffer from confounding factors including international NGOs funding, intensive training and an innovative program. This may hamper the relevance
of their findings to external health systems (Emdin CA et al, 2013; Emdin CA and Millson P, 2013).

All the studies explored in this paper provide significant evidence that task shifting for ART showed equivalent health outcomes when compared with those treated by physicians. There are fewer losses to follow-up in the task-shifting groups. However, two systematic studies showed that the research on task shifting for ART care demonstrates that the good health outcomes could be part of the confounding factors that may have been lacking in the routine health system. Nevertheless, it is clear that task shifting should be accompanied and should be considered as a package with training, funding, supervision, decentralisation as well as the overall health systems strengthening.

2.3 Community-Based Approach

The idea of participation of people from the community in providing health care and health promotion rose in the 1960’s in the Primary Health Care (PHC) movement. A study done on PHC in 2014 demonstrated that in order to sustain comprehensive PHC practices in MLICs, the critical factors are well trained community health workers, effective community participation, co-partnership between government and community in program and policy development and support to community advocacy (Labonté R. et al, 2014). There are six key lessons learned from the past community health worker (CHW) program for the achievement of HIV and AIDS care and treatment. They are strong management, establishment of CHWs section, appropriate training, retention and incentive structure, good relationships with other health workers and community embeddedness of the program (WHOa, 2008; Campbell C. and Scott K., 2011).

Community health workers have many names in different countries: treatment supporters, community health agents, village health committee, community caregivers and buddies. CHWs is defined as any health worker carrying out functions related to healthcare delivery; trained in some way in the context of the intervention; and having no formal professional or paraprofessional certificated or degreed tertiary education (Daniels K. et al, 2014). The CHWs take the health services to the doorsteps of the family. CHWs as part of the PHC have existed for more than 50 years and have revitalized the response to HIV and AIDS burden (Daniels K. et al, 2014). Generally, CHWs received ART specific training from two days to four weeks. They are responsible for delivering ART drugs to patients, monitoring clinical
symptoms, adherence monitoring and referring patients to health clinics (Kredo T. et al, 2014, p. 12; van Olmen et al, 2012 p. 5-6).

In 2008, WHO recommended that out of 313 tasks, which were identified in the HIV and AIDS prevention and care program, 115 can be performed by CHWs. Out of 115, 48 tasks are medically oriented and the remaining are socially oriented tasks (WHOa, 2008). Involvement of community and peer support group improve patients’ adherence to ART and retention and contribute to their empowerment; particularly the inclusion of PLHIV (People Living with HIV) in their daily care; it will ensure lifelong adherence and retention (van Olmen et al, 2012). According to a study done in Uganda and Kenya ART delivery models using community and PLHIV peer support groups had a good adherence and survival. The community and PLHIV peer support groups main tasks were the monitoring of patients, ARV drug delivery and referral of patients to health facilities (Abaasa M. et al, 2008; Wools-Kaloustian K, et al, 2009). Peer support groups of ART program in Thyolo, Malawi were formed from PLHIV at community level. These support groups mobilize and encourage treatment seeking behaviour, adherence and retention (Bemelmans M. et al. 2010, p. 3).

Table 2.3: ART outcomes from task shifting at community and health centre levels

<table>
<thead>
<tr>
<th>Thyolo district, Malawi</th>
<th>Lusikisik, South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>With CHWs</strong></td>
<td><strong>Without CHWs</strong></td>
</tr>
<tr>
<td>Placed on ART</td>
<td>895</td>
</tr>
<tr>
<td>Alive and on ART</td>
<td>856 (95.6)</td>
</tr>
<tr>
<td>Died</td>
<td>31 (3.5)</td>
</tr>
<tr>
<td>Lost to follow-up</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Stopped</td>
<td>7 (0.8)</td>
</tr>
<tr>
<td>CD4 at 12 months Determined</td>
<td></td>
</tr>
<tr>
<td>≥200 cells/mm³</td>
<td>NA</td>
</tr>
<tr>
<td>Viral at 12 months Determined</td>
<td></td>
</tr>
<tr>
<td>&lt;400 copies/ml</td>
<td>NA</td>
</tr>
</tbody>
</table>

The standardized ART program was compared to the patient outcomes with and without community support in Malawi, Thyolo district, showing significantly better outcomes in those with community support in terms of death and loss to follow-up (P<0.001). Similarly, in Lusikisik, South Africa, there is a comparable health outcome in hospital and health centre ART program. The health centre is closer to the patients, which led to faster enrolment in to ART and better retention in treatment than in the hospital. The above table in South Africa and Malawi showed that task shifting to nurse (Type II task shifting) and to community (Type III task shifting) substantially improved ART outcomes. It also found in the two countries, that task shifting did not compromise quality of health care (Zachariah R. et al, 2007; Bedelu M. et al, 2007).

Lay community health workers can contribute effectively to ART delivery models with appropriate training. CHWs brings positive benefits in increasing access, improving adherence, retention and loss to follow-up and with virological suppression and improvement in immunological and survival. Bringing the health services close to the community would be cheaper in terms of time and transportation cost to the HIV patients. Engaging community concern in their health will improve in addressing of their health problems and thereby sustaining the health intervention. Furthermore, it allows for easy identification of health needs of the community.

2.4 Cost-effectiveness of Task Shifting Strategy

Many studies found task shifting to be efficient. With the introduction of task shifting strategy, doctors and senior clinical health staff have more time to work with complicated patients. A study done in Rwanda showed that nurse-led ART reduced doctors’ demand on ART by 76%. Physicians had more time to focus on more complicated non-HIV related tasks (Chung J, 2008). Similarly, a systematic review done in task shifting showed that time savings from nurse-led ART resulted in a 183% increase in doctor capacity for non-HIV related tasks. The same review also showed that reductions in waiting times and loss-to-follow-up was observed in task shifted ART delivery (Callaghan et al., 2010, p. 2).

The above review reported that doctors’ salaries could be the largest cost of running in an ART clinic. For instance in South Africa, study found that doctors’ salaries comprised about 42% of all clinic costs, including supplies and running costs. The same review showing average annual clinic cost per ART patient in Uganda and South Africa found that mean costs
were almost a third less in Uganda ($US331 vs $US892). This study concluded that task shifting might have helped to be more cost-effective in Uganda (Callaghan et al., 2010, p. 2-3). According to Babigumira J. et al (2009) task shifting in ART treatment is cost-effective and saved physicians’ time in Uganda. The study estimates that the annual national physician ART follow-up expenditure is USD 5.92 million while it is USD 4.41 million for nurse-led and $1.85 million for pharmacy worker ART monitoring. The study concluded that task-shifting results in substantial cost and physician time savings and can contribute to reducing the health burden. A cluster-randomized trial in Jinja, Uganda reported costs of health-service delivery of USD 793 for community ART delivery models and US$838 for the usual facility care per patient per year. The study shows that the community ART delivery model is an efficient and effective strategy, particularly in remote areas in which clinical infrastructure is scarce (Jaffar S, et al, 2009, p. 2087-2088).

A systematic review in SSA showed that the costs to patients are doubled in hospital-based ART care when the only consideration is the cost of transport (USD 0.75 average cost of a patient on the task shifting group and USD 1.5 hospital-based group). It is triple the average costs to patient in hospital as compared to the task shifting group when considering transport, lost work time, food and child care cost. The same systematic review also demonstrated the costs to health service care when comparing nurse-led and physician initiated and maintained ART. Nurse-led ART care was associated with higher health services costs as compared with doctor; this is because of the costs of training, supervision and ARI treatment (Kredo T. et al, 2014, p. 22).

According to the analysis provided above, task shifting from physician to non-physician health worker or lay community is potentially a cost-effective strategy in addressing the human resource shortage to ART rollout in SSA. The initial costs of training and remuneration of non-physician health workers are lower than physicians within a country. In the above study, a comparison on average annual costs per patient for ART were done for the two countries, Uganda and South African. However, it is difficult to compare it, as the two countries are not at the same development levels, thereby there are different salary scales, and other running costs.

Task shifting brings health services close to the community and is cheaper in terms of time and transportation cost to the HIV patients. However, task shifting as well requires additional
resources and significant investment for training community and health workers, supportive supervision, overall strengthening of health systems and adaptation.

2.5 Perception, Attitude and Behaviour of Health Workers on Task Shifting
A case study done in Uganda reported that health workers have positive and negative opinions about task shifting. The health workers who have positive views on task shifting describe task shifting as necessary, and, on the contrary, those who are against it, describe it as a cheap sub-standard services and offering poor quality of care ((Dambisya Y and Matinhure S, 2012).

In the above case study in Uganda, health workers responded that task shifting is safe when well managed. For instance, doctors responded that clinical officers and other health workers could do many tasks. However, they accepted task shifting when well planned with guidelines and regulations to protect health professionals and provide quality of care for patients. The health workers reiterated that task shifting is not a new strategy, it is happening every day, and now there is an opportunity to do it in an organized manner (Dambisya Y and Matinhure S, 2012, p. 8).

The same case study in Uganda also reported health workers negative opinions in task shifting. Health workers responded that task shifting provided poor health services, instead of providing necessary formal education to the right people to render the health care services. Other health workers were of the opinion that health care is compromised by using a short sighted strategy of task shifting. Other health workers considered task shifting as a sub-standard treatment for the poor. On the contrary the rich are not being treated with the health care services rendered by tasks shifted ((Dambisya Y and Matinhure S, 2012, p. 8).

A study done in process evaluation in task shifting of ART treatment in South Africa noted that the attitude among physicians was mixed, while the majority supported the task shifting, but others were perceived to be uncertain about the ability of nurses to manage and appropriately refer cases that are more complex. However, physicians reported that there are clear decreases in physicians’ workloads to do clinical health care services. For instance, one physician was able to start seeing patients at other clinics because his work had been reduced significantly at the tasking shifting sites (Georgeu D. et al. 2012).
The ownership and involvement of all stakeholders particularly physicians, starting from the time of planning is very important for the success and acceptance of the program. Task shifting should not be associated with substandard services. It is not only done in developing countries but also in developed and rich countries. However, for task shifting to provide an overall good quality of services it requires standards and guidelines governing pre-services and in-service training requirement, supportive supervision, treatment protocols and effective referral system.

2.6 Conditions for Task Shifting

This section presents important elements that facilitate task shifting. In order for task shifting to be efficient, it requires an appropriate policy framework, adapting the public health approach, strengthening and decentralizing health services.

2.6.1 Health Policy Framework for Task Shifting for ART

Task shifting arranges health services in new models of delivery. The new models of delivery may or may not be in line with a current national health policy framework. Studies conducted on task shifting in Africa showed that frequent failure to provide adequate systems support was due to a lack of adjustment in the policy framework (WHOa, 2008, pp. 21). Samb B. et al. (2007) argued that task shifting has to be aligned with the broader strengthening of the health systems in order to be sustainable. Governments, international and bilateral agencies, NGOs and other stakeholders must work together to successfully implement a task shifting strategy by ensuring the establishment and endorsement of appropriate policy frameworks and building capacity as well as availability of reliable medium to long term funding (Samb B, et al, 2007, p. 2513; Lehmann U, et al, 2009 p. 2; Brook K, 2007; Samb B., 2008, P. 2513).

The East, Central and Southern African Health Community (ECSA HC) is an inter-governmental organization that fosters regional collaboration. In 2008, in its 46th Health Ministers Conference, the ministers urged member states to develop and implement policies, guidelines and training curricula on task shifting. The policy and guidelines for task shifting facilitated mid-level cadres to carry out specifically identified activities by 2010 (ECSA HC, 2008 by Dambisya Y and Matinhure S, 2012). According to research conducted in 13 East, Central and Southern Africa countries, 72% of the countries practice task shifting for human resources on ART. However, only 57% reported that their national health policy framework had been revised to incorporate additional professional roles and responsibilities (McCarthy
Task shifting requires reorganizing of health services delivery and roles and responsibilities in health workforce. Many countries in SSA are implementing task shifting models for health delivery without an appropriate policy framework. During task shifting health workers need protection by laws when they perform beyond their legal scope of practices. This calls for a regulatory framework to be in place to regulate task-shifting practices. The health workers who received the tasks should get proper pre-services and in service training and supportive supervision and accreditation. During the implementation of task shifting strategy safety of patients and quality of health care services should be placed at the centre.

**2.6.2 Public Health Approach**

According to WHO reports, the western way of delivering health services using specialist and physician management including advanced laboratory monitoring is not realistic in SSA. As a result, WHO is promoting a public-health approach to scale-up ART. This model is the only way to make ART rapidly accessible to the millions of people in need in SSA. This is done with task shifting into lower levels of health cadres and communities (Gilks C. et al, 2006, p. 505). The public health approach is defined as an approach that uses standardised regimens and simplified clinical decision making (WHO2006). The main principles of this approach are simplification of treatment protocols, task shifting and decentralization of ART delivery to the PHC and community level. The standardized protocol and simplified guidelines facilitate the decentralization process to lower levels of the health systems. This approach needs to be supplemented with standardized training, supportive supervision as well as well-functioning referral systems (Zachariah R. et al 2009; WHO2008; van Olmen, 2012).

In using task shifting and public health approaches, there is an improvement in access, national coverage and geographical equity. Most of the people who benefit from task shifting are the rural and remote communities as they have a more acute shortage of health professionals than the urban centre of the same country.
2.6.3 Strengthening Health Systems and Decentralization

For a health system to carry out its purpose requires well-functioning six essential building blocks. They are services delivery, health workforce, information system, medicine, funding and leadership. Strengthening the building blocks helps the health system to perform well in terms of access, coverage and quality of health services. If one of the building blocks is missing, the health system will not function properly (WHO, 2010).

For health facilities to function well at the primary health level a minimum of supporting services need to be in place, such as trained human resources, a continuous drug supply, and referral system. In Ethiopia and Malawi donor funds were used to strengthen health infrastructure and human resources to expand the ART services. The investments in health care have a positive spill over effects on the health system, which contribute to the improvement of health quality and utilisation (van Olmen et al, 2012; Rasschaert F., 2011). According to a systematic review of 16 studies, to increase access to ART care, two important models of decentralization and task shifting are introduced. There are many definitions of decentralization but in this paper it is defined it narrowly in terms of the provisions of care in the lower levels of health systems. Decentralization of care could be defined as the transferring of ART care from a centralized system that is a hospital to a lower level of health care, which is geographically closer to the patients. According to this review, there are full and partial decentralizations. Partial decentralization is ART initiated in hospital and maintained in health centre or community for HIV patients while full decentralization for ART is initiated and maintained in health centres for HIV patients or maintained in community. Decentralization is often accompanied by task shifting as part of the delivery model but task shifting may or may not occur with decentralization. The good health outcome may result from improved patient care by nurses, owing to a lower workload and less time and cost for patients as compared to centralized sites. Decentralization increases access, retention and health outcomes and fewer losses to follow-up (LTFU) (Kredo T., 2013). According to another systematic review, the estimated mortality rate among HIV patients on ARV who LTFU was 40% (Brinkhof M. et al, 2009).

Strengthening health systems require reinforcing the six building blocks. Task shifting and decentralisation are considered important models of ART delivery in SSA. Decentralization of ART care improves access, losses to follow-up and adherence of HIV patients without
compromising the quality of care. Task shifting and decentralization to be successful requires a parallel improvement in the health system in terms of drug supplies, training, funding etc.

3. Evidence on Task Shifting for NCDs
In developing countries in general and Sub-Saharan Countries in particular, task shifting has been used in a response various diseases including HIV and AIDS, tuberculosis, mother and child health, and non-communicable diseases. Task shifting strategy in the field of NCDs particularly in diabetes is not as widely introduced as for HIV. This chapter reviews the commonalities between HIV/AIDS and diabetes as well as the limited evidence on task shifting for NCDs focusing on diabetes in SSA.

3.1 Non-Communicable Chronic Diseases Dimension Framework and Model of Delivery
Chronic Diseases are illnesses of long duration illness and generally of slow progression that can be controlled but not cured. van Olmen et al (2012) provided comparisons between two chronic diseases, HIV and AIDS and Diabetes mellitus in accordance with four dimensions of chronic conditions (see figure 3.1).

Figure 3.1 Comparing the chronicity dimensions of HIV AIDS and diabetes

Source: van Olmen et al, 2012

1 University of Michigan Center for Managing Chronic Disease: http://cmcd.sph.umich.edu/what-is-chronic-disease.html, (accessed on June 30, 2015)
The personal dimension entails the experiences of the patients themselves, their coping mechanism and attitude to the disease and psychological and physical suffering inflicted on them. The health provider dimension refers to the professional involvement needed to treat the patients and the complexity and frequency of the treatment. The fourth dimension is the environmental dimension, which includes family and society where the patients live. The patients affect and will be affected by the family and society and this will influence the coping of disease management (Van Olmen et al, 2012).

Both diseases have a slow progression and in an advanced stage lead to increased morbidity, which affects multiple organ systems. In HIV and AIDS, premature mortality caused by opportunistic infection is higher than in diabetes especially in the absence of ART. In diabetes mellitus (DM) there is a notable risk of acute life threatening development such as hypoglycaemia and hyperglycaemia that requires 24-hours access to medical advice. In addition, in DM the treatment is more complicated than in HIV and AIDS in terms of choice of treatment regimen (Van Olmen et al, 2012).

There are few publications for diabetes health services provisions in SSA. Health care for diabetes patients is provided mainly at secondary healthcare level because of the complications of treatment and monitoring. The main model of care is the Chronic Care model (CCM) which has been used in developed countries and has recently been introduced in Ethiopia and Uganda but so far, no evaluation has been made. The CCM approach includes clinical guidelines, redesigning of the health care to include self-management, reorganising of care to focus on teamwork, putting in place an information system for follow-up and creating community linkage (van Olmen et al, 2012)

3.2 Impact of Task Shifting for Patient Health Outcome on NCDS

In rural and urban Cameroon that comprised essentially non-communicable diseases; health intervention was being implemented with task shifting. The program included type 2 diabetes, hypertension, asthma and epilepsy. Nurses were trained to manage diabetes and 225 diabetic patients were followed during 1110 patient-months. There was a substantial dropdown in fasting capillary glucose by 1.6 mmol/L (P <0.001). In addition, among the patients with hypertension, blood pressure also decreased significantly (Kengne A. et al, 2009 p. 182-184). This model of NCDs management has been introduced in Ethiopia and showed good health results. In Ethiopia, nurses were trained to provide treatment for chronic non-communicable
diseases with the supervision by doctors. The aim is to bring the treatment near patients’ homes and to respond to the unmet needs of chronic diseases in particular with diabetes and epilepsy. As a result, nurses treated 44% and 11.4% of the patients with epilepsy and diabetes respectively at the health centre. The cost of insulin and the unstable supply created the bottleneck identified for a small number of diabetes patients’ consultations (Mamo Y. et al, 2007, p. 229-230).

In the cohort study in rural South Africa that decentralized diabetes care to primary health care level, nurses diagnosed and treated patients with diabetes. A nurse-led simple protocol diabetes care and patient education system was implemented. In this cohort, 284 patients were involved and glycaemic control was done at several intervals. The HbA1C was decreased from 11.6% at baseline to 7.7% after 18 months of follow-up. The study also demonstrated that education of the diabetes patients alone without treatment helped to control HbA1c from 10.6% at baseline to 7.6% in 18 months. The study concludes that the diabetes delivery model used here is an appropriate one and could be used in other resource settings (Gill G. et al, 2008, p. 606-611).

A systematic review of 22 studies of NCDs in middle and low income countries (MLICs) showed that the success of task shifting from physician to NPHWs (Non-Physician Health Workers) depends on disease specific protocols for screening, treatment and drug titration, training of NPHWs and health system restructuring. The same systematic review revealed that in rural South Africa trained NPHWs with the assistance of treatment protocols could achieve control of 68% of patients with hypertension and 82% with diabetes. In addition, the studies demonstrated that there was a high level of agreement between physicians and NPHWs in diagnosis, screening and management of NCDs. In this review, the barriers were restrictions on the NPHWs on prescribing medications and the fact that medicines had run-out. This review has also demonstrated that task shifting was cost-effective (Joshi R. et al, 2014).

The comparison of HIV and DM in terms of medical, health provider, patient and environmental dimensions showed both diseases have commonalities. The response program to address the HIV and AIDS and DM will learn from each other. The task shifting strategy implemented in diabetes is very limited and seems to focus more on nurse-led diabetes programs. The treatment complication of diabetes requires caution when applying lessons learned from ART.
3.3 NCDs in Humanitarian Emergency

Little literature exists in task shifting in humanitarian settings. Humanitarian actors have made progress in responding to the excess mortality and morbidity found in large refugees’ camps, which fuelled endemic infectious diseases and acute malnutrition. Nowadays, the demographic and disease burden of conflict-affected populations are changing because populations are living in non-camp like situations. Non-communicable chronic diseases are becoming increasingly prominent in conflict settings and much excess morbidity and mortality results from the exacerbation of non-infectious diseases like hypertension and diabetes (Spiegel P., 2010).

During a humanitarian emergency, NCDs may be considered as less of a priority in SSA, although WHO has prioritized it as important. For instance in Mali in the humanitarian emergency of 2013, the traditional donors declined to fund diabetes for the reason that diabetes is not an emergency. However, individuals with diabetes are less able to cope without access to adequate nutrition and medication because of the chronic nature of the diseases. For instance, individuals with diabetes may run out of glucometers and insulin, which will endanger his or her life (Demaio A.et al, 2013; Besançon S. et al, 2015).

4. Discussions and Conclusions

4.1 Discussions

The burden of chronic diseases in general and diabetes mellitus in particular in SSA is tremendous and expected to increase in the future and access to health services remains a challenge. The acute shortages of health workforce is one of the challenges that must be overcome to improve treatment of diabetes. The task shifting strategy proved to be efficient for intervention for ART and there is substantial evidence of improved health outcomes to patients. Countries in Sub-Saharan Africa could benefit and apply lessons learned and best practices identified in ART to address the shortage of health workers in NCDs, especially for diabetes mellitus. In addition, the chronic nature of the both HIV and diabetes mellitus have communality, which can learn from each other.

4.1.1 Community-based approach

A Community-based approach brings the health care closer to the service users and empowers communities. As it is well known, in SSA there are too many HIV and NCDs patients with too few clinicians and nurses. Communities and patients engaging in the diabetes
interventions help to address, the workforce bottleneck. This entails empowering the communities and patients and providing them with appropriate training to take over specific tasks. The diabetes patients and communities become active participants in their care rather than passive recipients. In addition, it has the advantage of creating bridges between health facilities and communities, which could help to identify perceived health needs and local job opportunities. However, the tasks that are shifted to the communities and patients should be limited to the capacity and training provided. The body of literature on ART delivery tells us, CHWs can properly perform a number of functions such as delivery of ARV drugs to patients, monitor adherence and retention, monitor clinical symptoms and refer cases to clinics while promoting treatment-seeking behaviour. Communities and peer groups’ engagement needs an enabling supportive environment and a regulatory framework, incentive structure and a long-term vision and commitment by the national governments and international donors to sustain diabetes program interventions. Furthermore, preparing a breakdown of the diabetes mellitus treatment and management related activities into different tasks and should be categorized into which tasks could be done by CHWs and other health cadres.

People living with diabetes self-management are able to adjust their diet, make continuous routine physical activities and identify risk signs and symptoms. Therefore, education for diabetes patients and the community is more important and it should be more intensive than for an HIV program. Unlike people treated for ART, diabetes patients do not suffer from stigma and discrimination and it is relatively easier for patients to seek treatment and request support from families and friends. Education for diabetes patients alone can significantly improve glycaemic control; this is not the case in HIV.

4.1.2 Conditions for task shifting strategy
The NCDs program could profit from the lessons learned on task shifting for ART. The lessons learned are strengthening health services, maintaining a supportive health policy framework, involvement of stakeholders, funding, pre-services and in-service training, simplified treatment protocols, strong referral systems and decentralization.

This paper demonstrates that good lessons for non-communicable chronic diseases have been learnt. Task shifting alone will not produce the desired health outcome unless accompanied by a strengthening of health systems. The health systems in SSA are often weak and fragile; it would be necessary to think in terms of the health system building blocks. It is obvious that
one system building block has a positive or negative impact on other blocks. For instance, the availability of drugs and supplies will depend on the stewardship. Considering task shifting only without solving the bottlenecks of the supply chain of drugs and medical equipment will not be successful.

Task-shifting interventions attested positive health outcomes but is hampered by a lack of clear health policy framework in some SSA countries. Many countries in SSA reserved ARVs prescriptions to physicians and that hindered the task-shifting program. National governments are reluctant to endorse task shifting as they doubt whether the same quality of health services would be provided. Task shifting requires reorganizing of the health services delivery and make a change in roles and responsibilities as well as changes the scope of practices in the health workforce. National governments need to revise health sector and human resources strategies to establish an enabling environment to undertake task shifting. The regulatory framework should protect both the public and private health workers when performing tasks beyond their legal and traditional scope of practices. The task-shifting modalities need to be adapted to the country context, as the underlying reason for initiation of task shifting may vary according to health workers limitations and the burden of the diseases. It should be decided which tasks should be reliably performed by which health cadres. For instance, shifting tasks to nurses without correspondingly moving tasks to lower cadres of health workers or the community or patients themselves could overburden nurses. Task shifting in diabetes should learn from the ART in order not repeat the same mistakes.

Diabetes mellitus can gain from the experiences of ART which means not only transferring tasks to a lower cadre of health worker but requires a large investment to strengthen the health services. Task shifting without national and international short and long-term financial commitment and investment in the health system will not be successful. Investment in pre-services and in-services training for the workforce, supportive supervision, medicines, equipment, and the establishment of health information and reporting systems. In addition, donors should not only finance the supply of drugs and other health services but they should also earmark funds for health personnel’s salaries and for creating a conducive environment. Health officials should not view task shifting as a cost saving measures as this could compromise the quality of health care. However, there are competing priorities between infectious diseases and NCDs. Infectious diseases like HIV are receiving more attention than NCDs like diabetes. NCDs received less than 3% of development assistance for health from
2001 to 2008, even though they cause more than one-third of all premature deaths (Rachel A et al, 2010). The financing for a diabetes program may be scarce and this could limit the task shifting to replicate and be implemented effectively as in the HIV program.

Another important lessons are training and motivation of health workers and accreditation. The health workers who receive the tasks should get proper pre-services and in-service standardised training and regular supportive supervision during their practices. Pre-services and in-services training of health workers are fundamental for the success of task shifting. Tasks transferred and responsibility given to lower cadres should be matched with the skills and knowledge acquired. The NPCs who assume management of diabetes should receive longer duration training than for the ART program considering the treatment of diabetes is more complicated and involved life-threatening development such as hypoglycaemia and hyperglycaemia. Specialized and formalized training on diabetes drug titrations and self-management should be provided to nurses in order to manage the diabetes mellitus program.

It is crucial for roles to be clarified to the different cadres and the work environment should be improved to ensure the assumption of responsibility and accountability. It is difficult to sustain the achievement of health outcomes in the long run without appropriate financial rewards, career development and recognition for health workers, when tasks are shifted to them. The rewards and recognitions, the health workers receive should be stipulated in the health policy in order to have uniformity. In addition, accrediting and credentialing must be designed and implemented.

The most practical lessons learned from task shifting in ART that could be adapted to NCDs are concerned with the public health approach. It is realistic for NCDs because it simplifies and standardizes both regimens and clinical decision-making. This approach helps to easily facilitate task shifting to the lower cadre of health workers and community as well as to decentralise health care management to lower levels. The public health concepts need to be supplemented with standardised training, supportive supervision and strong referral systems. In addition, these measures help to improve access and national coverage and equity. Furthermore, tools and systems that are being used by ART can be adapted to diabetes mellitus program such as medication reminder systems, follow-up for PLHIV who have not returned for their appointment, counselling systems to support adherence and forms and charts.
Another important lesson learned from ART task shifting is the benefit of establishing a strong referral system. Referral systems with clear guidelines are important to facilitate patients with complicated cases to the health care provider. The referral systems need also to be supplemented with a good transportation system. If there is no strong referral system together with transportation, complex cases could not be referred to higher health facilities and this could compromise the task shifting strategy.

Evidence suggests that any model of ART decentralization does not lead to deterioration of health outcomes but losses to follow-up is reduced and treatment is more accessible (Kredo T et al, 2014). There is good evidence from ART that task shifting with decentralization and PHC increases community empowerment, access and quality of health care. Decentralization provides the authority and power to the local community and primary health care facilities to make decisions concerning in the service provisions and managements. Moreover, bringing the health care close to the community through task shifting will enable NCDs patients to access the health care with lower financial costs. Task shifting combined with decentralization reduce the workload of health worker by sharing tasks to a lower level health workforce. This helps to free capacity of the clinic-based health workers to concentrate on complicated cases.

4.1.3 Task shifting in Humanitarian Settings
The health systems are generally weak in SSA countries and during humanitarian crises may be completely or partially destroyed, when healthcare are needed the most. People living with NCDs in general and diabetes in particular are vulnerable even in peacetime. The condition of these people is aggravated in humanitarian crises as the situation increasingly becomes susceptible to the disruption of health services and to an inadequate food supply. There are few publications on how task shifting is practiced in the humanitarian settings. If task-shifting strategy has been developed, implemented and well established during peacetime, it could furnish the basis to be used during humanitarian and protracted crises; especially, when tasks are transferred to the communities and patients (task shifting type III & IV). The knowledge and skills acquired and systems established during peacetime can be used during a humanitarian emergency as communities are often displaced together.

4.1.4 Task Shifting Models in NCDs
4.1 Types of task shifting in NCDs that have been adapted from ART in Africa
<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
<th>Opportunity/Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>The extension of practice to NPCs in order to enable them to assume some tasks previously undertaken by more senior cadres, e.g. doctors to health officer</td>
<td>Not much opportunity to transfer tasks to health officers, few publications exist for this type of task shifting.</td>
</tr>
<tr>
<td>Type II</td>
<td>The extension of practice to nurses in order to enable them to assume some tasks previously undertaken by senior cadres</td>
<td>Relatively many nurses in SSA, could potentially be used for diabetes patients treatment &amp; management</td>
</tr>
<tr>
<td>Type III</td>
<td>The extension of practice to CHWs or lay providers in order to enable them to assume some tasks previously undertaken by more senior cadres, e.g. nurses and NPCs or doctors</td>
<td>Unexploited potential and proved effective with some training to assume delivery of drugs, treatment support and referral of patients to clinics.</td>
</tr>
<tr>
<td>Type IV</td>
<td>People living with diabetes, trained in self-management to assume some tasks related to their own care that would previously have been undertaken by health workers</td>
<td>Unexploited potential. Self-management and healthy living is core in diabetes care</td>
</tr>
</tbody>
</table>

Source: Adapted from WHOa, 2008

There is no clear task shifting delivery models in NCDs but the task-shifting model that was designed by WHO in the context of HIV and AIDS program in SSA has implications for the management of NCDs. The most often reported types of task shifting are from physicians to nurses and from nurses to CHWs (task shifting type II and III). In SSA, nurses and other non-physician clinicians (NPCs) are relatively more common than physicians. Lay health workers and patients are an unexploited potential that could be used to provide healthcare and it could be a good opportunity to create links with the communities. It is feasible to use such NPCs with adequate support, training and supervision. Shifting tasks from physicians to health officers (type I task shifting) seems less used and only a small body of literature exist.

4.2 Conclusions

Task shifting is a viable option to respond rapidly to a health workforce’s crisis and could be clinically effective for the management of diabetes mellitus in SSA. However, task shifting
along will not address the problems. The task shifting models to function effectively should be combined with the strengthening and reorganization of the health services, adequate training and an enabling health policy framework. Task shifting with health system supports in place could ensure the equivalent care for diabetes patients as patients treated by physicians.

This paper found that NPHWs treat HIV patients with the same health outcomes as those whose treatment was provided by physicians and may result in fewer losses to follow-up. This strategy could feasibly be adapted to diabetes mellitus and probably would not compromise the quality of care. However, most of the studies done so far are relatively small in size and largely are based on observation studies. Therefore, more studies over longer duration are required to explore more evidences and to assess the efficiency and effectiveness of each task-shifting model. In addition, task-shifting strategies are complex, with many components other than just shifting responsibilities to lower level workers and research on the cost effectiveness of the whole interventions are necessary. Furthermore, the studies done on task shifting are more focused on the medical result and there is limited research on the acceptability and satisfaction of the task shifting by patients and health workers. Researches are required specifically on the satisfaction of patients. Other important studies could be the transferability of the lessons learned from task shifting for ART to diabetes mellitus.

Generally, task shifting is accepted as strategy to increase access to care. However, there is a concern about the quality of health care with task shifting by some health professionals and national governments. Task shifting to be implemented successfully requires leadership from national governments and health professionals. Sharing of task shifting evidence with advocacy is important to buy-in the concept of task shifting and for sustainability of the strategy. Further, more research is required to identify the resistance of policy makers to the endorsement of task shifting.

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Annex I: Traditional roles compared with task shifting roles of health staff for ART in South Africa

A typical example of task shifting to health workers is shown in the table below and demonstrating different roles of health workers between traditional and task shifting models of delivery. Task shifting and decentralization were introduced in Lusikisiki, South Africa. Tasks were delegated to lower level health workers (Bedelu M, et al, 2007, p. 465).

Table 1: Traditional roles of health staff for ART care, compared with roles of health staff in the Lusikisiki program (South Africa)

<table>
<thead>
<tr>
<th>Category</th>
<th>Traditional role</th>
<th>Roles in the Lusikisiki program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>Conduct patient consultations: OIs, Clinical staging, ART initiation</td>
<td>Mobile visit: sees only problem cases, Supervise clinics and mentor nurses</td>
</tr>
<tr>
<td>Nurses</td>
<td>Support physician, Conduct VCT, Prepare individuals for ART &amp; monitor, Manage drug supply, Supervise community caregiver</td>
<td>Manage OIs, Perform clinical staging, Initiate ART, Supervise clinic staff</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>Manage drug supply Oversee prescriptions</td>
<td>Provide mentoring to pharmacist assistant</td>
</tr>
</tbody>
</table>
Pharmacist’s assistants | Play a limited role (dispense drugs only under strict pharmacist supervision) | Manage drug supply, Dispense drugs Check adherence, Identify individuals who default  

Adherence counsellors | Not utilized | Prepare individuals for ART, Run ART support groups, Collect data, Mentor community caregivers, Trace individuals who default  

Community caregivers | Promote health, Directly observe treatment | Run HIV support groups  

Support groups, committees, activists, people with HIV/AIDS | Not utilized | Prepare individuals for and monitor adherence to ART, Promote health in community, Recall individuals who default, Advocate for better service delivery


**Annex II: Tasks transferred to community health workers in Thyolo district Malawi**

Typical ART related tasks transferred to community health workers in Thyolo district Malawi and showed success in health outcomes. These are the types of tasks performed by CHWs with some training.

**Table 2: Community support for ART delivery in Thyolo District, Malawi**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specific activities</th>
</tr>
</thead>
</table>
| Management of opportunistic infection | Home-based diagnosis and management supervised by community nurses  
Symptomatic treatment  
Monthly supply of CTX prophylaxis for individuals too ill |
<p>| Recognition and referral of individuals with risk signs to community nurse or | Referral of patients with worsening signs of dehydration despite oral rehydration, persistent difficulty in swallowing despite medication for oral thrush, reduced level of |</p>
<table>
<thead>
<tr>
<th>Hospital</th>
<th>Consciousness, progressive worsening of headache.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence counselling</td>
<td>One-to-one supportive counselling for CTX and ART</td>
</tr>
<tr>
<td>Counselling on drug reactions and early referral</td>
<td>Early recognition and referral of individuals having possible drug reactions to ART, CTX or anti-TB treatment</td>
</tr>
<tr>
<td>Default tracing</td>
<td>Active tracing of individuals who do not attend scheduled follow-up visits or drug collection appointments</td>
</tr>
<tr>
<td>Support to family caregivers</td>
<td>Provide HIV education; counselling on ART, CTX and anti-TB treatment; early recognition of possible drug reactions; nutritional supplementation and palliative care</td>
</tr>
<tr>
<td>Community mobilization and awareness</td>
<td>Various forms of information, education and communication</td>
</tr>
</tbody>
</table>