Clinical Review

Clinical Review identifies issues in the medical literature of interest to clinicians in Africa. Essential references are given at the end of each section

Sickle cell anaemia

Sickle cell disease (SCD) is an inherited disease caused by a single-gene mutation affecting the β-globin gene (HBB) on chromosome 11. It results in abnormality of red blood cells (RBC), which affects their shape and function, and subsequently influencing nearly all organ-systems of the body.[1] The term sickle-cell disease refers to all the different genotypes that cause the characteristic clinical syndrome, whereas sickle-cell anaemia (SCA), the most common form of sickle-cell disease, refers specifically to homozygosity for the β^S allele. Our focus in this review will be on SCA.

Epidemiology

SCD is one of the most common genetic diseases in the world with over 300,000 babies with SCD being born annually and majority of these from sub-Saharan Africa.[2] This number is expected to increase to up to 400,000 individuals by 2050. Globally, the sickle cell trait has its highest prevalence in Africans and among people of equatorial Africa, Mediterranean basin and Saudi Arabian origin with the highest prevalence in countries like Cameroon, Democratic Republic of Congo, Gabon, Ghana and Nigeria.[3] Nearly 90% of the world's SCD population lives in three countries: Nigeria, India, and the Democratic Republic of Congo, where the disease affects up to 2% of the population, and the sickle cell trait of as high as 10 to 30%.[4,5] In East Africa, Tanzania has one of the highest annual births of SCD individuals in the world, estimated to reach 11 000 births a year.[1]

Uganda is also burdened by SCA. A national sickle cell survey done by Ndeezi et al, revealed prevalence of the sickle cell trait of 13.3% in 112 districts assessed. The prevalence was highest in the Mid Northern and East Central regions of the country. Among babies aged 6 months or younger, the overall prevalence of sickle cell trait was 13.2% and of disease was 0.8%, which suggests that at least 15,000 babies per year are born with sickle cell disease in Uganda. The prevalence of sickle cell disease approached or exceeded 1·0% in four regions, which is higher than predicted when based on the prevalence of sickle cell trait.[6]

Diagnosis and screening

Diagnosis of sickle-cell disease is based on analysis of haemoglobin by protein electrophoresis or chromatography. For high-throughput testing, haemoglobin mass spectrometry and DNA analysis are increasingly being used.[7] Antenatal screening is available to women in some countries to help to identify couples who are at risk of having a baby with sickle-cell disease, and to offer prenatal diagnosis.

Universal newborn screening programmes are established in the USA and England, with other programmes being developed in Europe and Africa.[8] In 2017 Uganda embarked on a comprehensive program to reduce the burden of SCA through the newborn sickle cell screening (NBS), which involves testing of newborn babies and all children below 2 years from high prevalence areas for SCA and trait.

Pre-conceptual testing for SCD is recommended in high-risk groups. An individual concerned must be informed of the result, and if an abnormality is detected (HbS), partner testing should be offered, and counseling given.

Management of SCA is subdivided into five areas in order to give thorough and holistic care. The general aspects of management for people with SCA include the following:

a. Oral penicillin prophylaxis given twice daily for all patients with HbSS until 5 years of age.
b. Vaccination with the pneumococcal polysaccharide vaccine to immunise patients against streptococcal pneumonia and meningococcus.
c. Annual screening for proteinuria with urinalysis beginning at 10 years of age.
d. Screening for pulmonary hypertension and systemic hypertension may be considered.
e. Screening for sickle cell retinopathy to begin at 10 years of age.
f. Transcranial Doppler (TCD) for patients 2 to 16 years for stroke prevention with actions based on results. Adults are not recommended to be screened with TCD.

Managing acute complications

Acute pain is the most common complication of CSA that leads to outpatient clinic visits and hospitalisation. Although acute vaso-occlusive pain is usually self-limiting, when it is of increased frequency it is associated with early death in patients with SCA who are older than 20 years.[9] Opioids, particularly oral morphine is the treatment of choice for severe acute pain including pain in children,[10] but no additional benefit from NSAIDs such ketoprofen.[11] Acute pain management needs to be implemented following guidelines to deliver timely, effective analgesia to the patients.[12]

Bacterial infections are a major cause of morbidity and mortality in patients with SCA. Impaired splenic function, defects in complement activation, micronutrient deficiencies, and tissue ischemia are some of the causes for the increased susceptibility to infections. Penicillin prophylaxis and immunisation with conjugate vaccines directed against Streptococcus pneumonia and H influenzae type B reduces the risk of such infections.

Acute chest syndrome (ACS), a form of acute lung injury characterised by the development of a new alveolar pulmonary infiltrate involving at least one lung segment caused by a combination of infection, fat embolism, and vaso-occlusion of the pulmonary vasculature. If diagnosed, all patients with ACS should be hospitalised for

monitoring and treatment. The treatment includes use of broad-spectrum antibiotics, bronchodilators, oxygen and blood transfusion. If a patient has worsening clinical course, exchange transfusion should be performed.

Hepato-biliary complications should be managed depending on the specific issue. Acute cholecystitis should be managed with antibiotics together with surgical consultation for possible cholecystectomy. Possible acute hepatic or intrahepatic crises should be treated with hydration. Blood transfusion is the recommended treatment in some cases.

SCD patients with neurologic signs and symptoms of an acute stroke should be evaluated urgently with radiologic imaging (non-contrast CT scan followed by MRI and MRA). Exchange transfusion should be performed if diagnosed. Following a stroke, all patients need to be transfused on a monthly basis, and if regular transfusion is not feasible, hydroxyurea should be started.

Managing chronic complications

The recommendations of management of chronic pain are mostly consensus-adapted. This includes the determination of the etiology of the pain, using a dedicated practitioner for the patient and an individualised treatment plan.

A vascular necrosis should be ruled out in SCD patients with hip pain and if diagnosed, the pain should be managed with analgesics including opioids. Referral to orthopedic surgery should be considered to provide non-surgical and surgical treatments.

Renal damage is a common complication of SCA because of the strong tendency for HbS to polymerise in the renal medulla, due to the low partial pressure of oxygen, the low pH, and the high osmolality causing erythrocyte dehydration. Treatment is beginning to focus on the early use of hydroxyurea and angiotensin-converting enzyme inhibitors in patients with clinically significant albuminuria.

Blood transfusion in the management of SCD

Transfusions can be a life-saving treatment of patients with SCA although the availability of matched units can be limiting. Transfusion corrects anaemia, decreases the percentage of HbS, suppresses HbS synthesis, and reduces haemolysis. Development of antibodies against the transfused red blood cells, resulting in delayed hemolytic transfusion reactions, can be life-threatening.[13] Symptoms of anaemia and aplastic anaemia should be managed with simple transfusions.

Hydroxyurea

In the early 1990s a study in which patients with sickle cell anemia were treated with daily doses of hydroxyurea, to assess pharmacokinetics, toxicity, and increase in fetal hemoglobin production in response to the hydroxyurea, resulted in an increase in the synthesis of fetal hemoglobin (HbF)and hemoglobin concentration, with only mild myelotoxicity.[14] This was followed by a double-blind, randomised clinical trial, to test for the efficacy of hydroxyurea in reducing the frequency of painful crises in adults with moderate-to-severe SCA. In this trial that was stopped after a mean follow-up of 21 months, hydroxyurea decreased the frequency of painful episodes, acute chest syndrome, the need for blood transfusion, and admission to hospital in patients with sickle-cell anaemia.[15]

The use of hydroxyurea in sub-Saharan Africa where conditions such as malaria, other infectious diseases are endemic but where the greatest sickle-cell burden exists remained unknown until recently. In Uganda, the NOHARM study, a randomised, double-blinded, placebo-controlled trial comparing hydroxyurea to placebo reported a reduction in SCA-related complications with use of hydroxyurea (45%) than placebo (69%; P = 0.001) and appeared to be safe for children with SCA without increased severe malaria, infections, or adverse events.[16] This study attracted a commentary re-affirming that the results of the NOHARM trial help address a major barrier to using hydroxyurea treatment in children with SCA in regions where malaria is endemic, thereby moving clinicians a step closer to its wider use across sub-Saharan Africa.[17] Another dose escalation study in four sub-Saharan Africa countries among children 1 to 10 years concluded that hydroxyurea treatment was feasible and safe in children with sickle cell anemia living in sub-Saharan Africa. Its use reduced the incidence of vaso-occlusive events, infections, malaria, transfusions, and death, hence supporting the need for wider access to treatment.[18]

Hematopoietic Stem Cell Transplantation

Myeloablative allogeneic haemopoietic stem cell transplantation, first used in sickle cell disease over 30 years ago, is the only curative treatment for SCD.[19] However, the procedure is mostly confined to children with HLA-compatible siblings, in whom the procedure is safest; in adults the procedure is unduly toxic. HSCT is only considered when serious complications have occurred, such as children with cerebrovascular disease who are dependent on transfusions. Studies done on HSCT in SCD indicate an overall survival of 92–94%, event-free survival of 82–86%, and a transplant-related mortality of 7%.[20]

Nonmyeloablative stem-cell transplantation in adults with sickle cell disease has been attempted using a protocol that includes total-body irradiation and treatment with alemtuzumab and sirolimus resulting into mixed donor-recipient chimerism and reversal of the sickle cell phenotype.[21] The nonmyeloablative approach seems to be the possible option for countries, e.g. Uganda, with less resources where sickle cell disease is a big problem.

Conclusion

Sickle cell anemia is a majorly African disease that needs African based solutions based on locally generated evidence. Early diagnosis together with best supportive care such as penicillin prophylaxis, pneumococcal vaccination and use of hydroxyurea have been shown to improve survival. Bone marrow transplant, the only potential cure for SCD, needs to be prioritised in sub-Saharan Africa.

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Safe motherhood

Thirty-two years ago, light was shone into the future of maternal health globally when a group of international agencies, health experts, development partners, and policymakers launched the safe motherhood initiative at a conference held in Nairobi-Kenya.[1] It was based on six pillars i.e. Family planning, antenatal care, obstetric care, post natal care, post abortion care and control of sexually transmitted diseases including HIV. With strong foundations on Primary health care, communication for behavioral change, equity and education for women, there were no doubts the overwhelming figures of maternal and neonatal mortality were to reduce globally. A lot of progress has been made but we are still presented with an unfinished agenda. I am one of those students in medical school who have had the privilege to serve the health needs of women, in a country where people are poor and women are the poorest of the poor. There is no more tragic event for a midwife or obstetrician than a maternal death. Am always reminded of a slogan 'pregnancy is special, let us make it safe'.

Signs of hope

In 2007, the parliament of Uganda resolved that safe motherhood should be made a priority for every woman.[2] This implied that emergency obstetrical care would be provided at local health centers (at least HC III), which serve people in a 12 km radius.[2] Funding was also committed to revitalising family planning at these clinics in an effort to limit unsafe abortion. Despite the limited resources, a lot has been achieved since then as reflected in the most recent Uganda Demographic and Health Survey (UDHS) 2016.[3] This revealed sparks of a tremendous progress in each of the pillars of safe motherhood, for example:

- More than 70% of the women were delivering with help of a skilled birth attendant.
- The maternal mortality had reduced by 24% from 438 to 336 deaths per 100,000 live births in the last five years.[3]
- The use of contraceptives among currently married women had increased from 23% in 2000 39% in 2016. And the unmet need for family planning dropping from 34% to 28%. This has greatly contributed to reduction in the fertility rates from 6.2 to 5.4 and unwanted pregnancies.
- Almost all women (97%) had received antenatal care from a skilled provider during their most recent pregnancy.
- 54% received postnatal checkups during the first 2 days after their most recent birth although WHO recommends 6 weeks of follow up after child birth.

Challenges

Although safe motherhood has got the attention internationally, with many agencies, organisations, donors and governments developing programs and funding to reduce maternal mortality, its goals and progress still remain hampered in many developing countries including Uganda.

Think of a nation where every woman would easily access and afford family planning, the 8 recommended antenatal visits, prevent and treat anemia, malnutrition, risky pregnancies, sexually transmitted diseases including HIV and deliver from a skilled health worker….!!! Despite the registered successes, a lot stands to be desired given the fact that most of the maternal and

newborn deaths in Uganda are due to preventable causes. There are three basic challenges women face in the effort to have the above services:

1. Delay in making a decision to seek the service
2. Delay in reaching the treatment facility
3. Delay in receiving the appropriate care at the facility

A number of socio-economic factors contribute to the delays. These include poverty, gender based factors in the patriarchy setting of most Ugandan families, poor infrastructure, inadequate hospital supplies and shortage of health workers especially in hard to reach areas among others. The fertility rates still remain high at 5.4 and these are associated with unmet family planning needs and early pregnancies since over 43% of the women in Uganda marry before the age of 18 years and have their first born before 19 years of age. By 2015 only 58.3% of the women in rural areas would attend the recommended antenatal visits and only 53% of such women would afford to deliver under a skilled heath worker. This puts the rest of the women at risk of pregnancy complications such as obstetric fistula. This is partly because most districts particularly in rural have minimal coverage by midwives. UNFPA reports that some districts in Karamoja, West Nile, Teso and Bukedi regions which are mainly rural have about 50-60% gap in midwifery staffing.

Recommendations

Safe motherhood should be everyone's responsibility from couples, journalists, local leaders, lawyers, policy makers and religious leaders. Everyone has a role to play, be it advocacy, community mobilisation or changing personal attitudes. Endeavours should be made to ensure that there are easily accessible and affordable health facilities for both mothers and children even in rural areas. Women should be empowered by engaging them in financially gainful employment and providing them with the necessary information concerning safe motherhood. This is very important if we are to break the three delays to safe motherhood.

A small hand book in simple non-medical English, 'MY PREGNANCY, a pregnancy guide for every woman' has been published to provide guidance on the dos and don'ts in pregnancy. It also provides information on the antenatal visits and checkups, self medication, danger signs, nutrition and physical exercise in pregnancy, among others. This is meant to solve the challenge of knowledge deficit among couples that would hinder them from seeking the appropriate as soon as possible. Such reading materials should be provided to all mothers at antenatal clinics. They provide grounds for informed choice for women in regards to health care.

Women should be empowered and made aware that it's their right to decide on the number and spacing of their children, and therefore seeking family planning services of their choice is their right. Girls should be encouraged to stay longer in school so as to reduce the rate of early pregnancies that in most cases are associated with complications like obstetric fistulas.

Efforts should be put in strengthening community-based health care by improving the skills of village health teams (VHTs) and traditional birth attendants in identifying danger signs and high-risk pregnant women for referral as soon as possible. Referral systems at the low-level health facilities should also be strengthened by reliable transport means be it tricycle ambulances at every health centre so that referrals are done as soon as possible to higher health facilities.

MCH mothers waiting at a health facility

Freely accessible family planning services should be provided in youth friendly environments to enhance utilisation as a key step in prevention of unwanted pregnancies and abortions. Teenagers should be empowered to seek post abortion care services at all the approved health facilities.

All pregnant women should be screened for HIV and syphilis and treated with involvement of their partners. Currently the ministry of health has adopted the health worker - induced HIV testing. This is a very good strategy for tracking HIV victims and have them linked into care. HIV-positive mothers should be well counseled on breastfeeding as many tend to fear breastfeeding, which puts the baby at risk of malnutrition.

Most of the maternal deaths are due to excessive blood loss during child birth and such women would survive if there was enough blood for transfusion. It's therefore very important that blood donation campaigns are taken country wide and the public should be encouraged to donate.

Today, a midwife in Uganda conducts between 350 and 500 deliveries per year which are more than twice the 175 deliveries per year per a midwife as recommended by WHO. There is need to revise the staffing norm to commensurate to the need including the rapid population growth. The working environment of midwives should be improved by providing adequate working space with water and lighting systems, provide staff accommodation closer to the health facilities, provide adequate safety gears like gloves, aprons among others in order to retain those that have been recruited. The government should address the rural-urban discrepancies by prioritising support to rural areas and providing incentives to rural based health workers. The government should also provide training bursaries for midwifery students with bonding to work in underserved districts with an increased salary to foster recruitment of midwives.

Finally, men should take up the responsibility to provide psychosocial support to their wives before, during

and after pregnancy.

I may not be around to see the dream of 'safe motherhood for all' come true. But I pin my hope on the health profession, backed by the power of women who are making advances and strides in securing their God-given human rights and in asserting their real worth. Women in many developing countries are progressing towards gender equality. They still have some steep mountains to climb, but women are not for turning. The future is bright for women and mothers of the world as long as they are taking the future in their own hands.

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Rheumatic heart disease

Rheumatic heart disease (RHD) is a chronic valvular heart disease, a sequelae of acute rheumatic fever (ARF) that affects children and young adults. Acute rheumatic fever is an immunological response to group A streptococcus that occurs 2-3 weeks after a sore throat in susceptible individuals.

RHD causes valve damage as a result of an episode or recurrent episodes of ARF. The most common presentation is mitral valve incompetence followed by aortic valve incompetence. Stenosis of the mitral valve may also occur, obstructing outflow of blood out of the left ventricle.

About 33 million people worldwide are living with Rheumatic Heart Disease (RHD) with 275,000 deaths a year. Rheumatic fever/RHD is a disease of children 5-15 years, though it has been diagnosed in children under 5 years.

Table 1: Diagnostic criteria for rheumatic fever: modified 2015 Jones criteria

Major criteria	
Low risk population	**High risk population**
Carditis (clinical or subclinical)	Carditis (clinical or subclinical)
Arthritis – only polyarthritis	Arthritis – monoarthritis or polyarthritis
Chorea	Polyarthralgia
Erythema marginatum	Chorea
Subcutaneous nodules	Erythema marginatum
	Subcutaneous nodules
Minor criteria	
Low risk population	**High risk population**
Polyarthralgia	Monoarthralgia
Hyperpyrexia (≥ 38.5°C)	Hyperpyrexia (≥ 38.0°C)
ESR ≥ 60 mm/h and/or CRP ≥ 3.0 mg/dl	ESR ≥ 30 mm/h and/or CRP ≥ 3.0 mg/dl
Prolonged PR interval (after taking into account the differences related to age; if there is no carditis as a major criterion)	Prolonged PR interval (after taking into account the differences related to age; if there is no carditis as a major criterion)

ESR – erythrocyte sedimentation rate; CRP – C-reactive protein

Unpublished data of an ongoing study has placed the incidence of ARF at 13% at the Uganda Heart Institute. Lubega et al noted that RHD was more common among the girl child at the Uganda Heart Institute with a mean age of 10-11 years. However, the prevalence is lower in HIV-infected children.

RHD can also present for the first time during pregnancy and time of delivery when pregnant women go into heart failure. The diagnosis is made by auscultation of the heart sounds and abnormal sounds (murmurs) can be easily heard. Pregnancy unmasks clinical features of RHD. Mitral regurgitation is often well tolerated unlike severe mitral stenosis which may manifest for the first time as pulmonary edema.

ARF is caused by a bacterium, group A beta haemolytic streptococci. A disease of the poor in low and middle-income countries who live in congested settings.

Diagnosis of ARF

Diagnosis is based on the Modified Jones' criteria 2015, (see Table 1). The criterion considers high-and low-risk populations: regions with a high prevalence of rheumatic fever like Uganda are considered high-risk populations. For the latter, the criterion improves sensitivity to increase catchment and not miss the diagnosis.

To diagnose a new case: 2 major or 1 major, 2 minor manifestations. To diagnose recurrent ARF: 2 major or 1 major and 2 minor or 3 minor manifestations.

Common presentation

Carditis, also known as pancarditis, is the most common feature, affecting 50-75% of patients. The endocardium is the most commonly affected, causing a valvulitis and heart failure. Carditis could present as pericarditis with chest pain worse upon lying flat and relieved by sitting up right. Myocarditis causes heart failure and poor left ventricular systolic function.

Joint tenderness (arthritis) (50%). Joint pains/ poly arthralgia was adopted among the major criteria. Arthritis could be mono arthritis or polyarthritis involving large joints unilaterally; knees, ankles and elbows. In high risk populations, mono arthritis was adopted as a major criterion in the modified Jones' criteria.

Chorea, commonly called Sydenham chorea, presents with abnormal body movements like spooning and darting of the tongue. Most times, the parents will report change in hand writing and clumsy behavior like dropping of utensils.

Other rare symptoms are including skin rash (erythema magnatum) and subcutaneous nodules.

High fever above 38 degrees Celsius, prolonged PR interval (first degree AV block) on electrocardiogram are among the minor diagnostic criteria along with a positive CRP (C- reactive protein).

Evidence of Preceding Group A Streptococcus Infection (at least one of the following)

1. Presence of increased or rising anti streptolysin O titer or other streptococcal antibodies (anti-DNASE B).
2. A positive throat culture for group A beta-hemolytic streptococcus.

3. A positive rapid group A streptococcal carbohydrate antigen test in a child whose clinical presentation suggests a high pretest probability of streptococcal pharyngitis

Untreated rheumatic fever results into rheumatic heart disease whose complications are; heart failure, stroke and infective endocarditis.

RHD clinical features

- History of body swelling, difficulty in breathing, right hypochondrial (abdominal) pain.
- Evaluate for edema and displaced apex beat in advanced disease.
- Presence of a thrill (palpable murmur).
- A murmur in the mitral or aortic valve area of the chest.
- Auscultation alone is not enough to make the diagnosis of RHD as there are other causes of similar abnormal heart sounds. Patients can also present with sub clinical RHD which can be picked on Echocardiography.
- Echocardiography increases sensitivity to RHD diagnosis by 50 fold.

ARF/RHD treatment

Intramuscular Benzathine Penicillin (BPG) is the Gold Standard for secondary prevention of recurrences of rheumatic fever and therefore halts progression of disease.

Prevention of Rheumatic fever:

1. Intra muscular Benzathine penicillin 0.6 MU for children under 30kg and 1.2 MU for above 30kg. Thereafter monthly BPG prophylaxis to prevent recurrences till 10 years after the last episode of ARF or age 21.
2. Treat complications of acute rheumatic fever (ARF) like heart failure with anti-heart failure drugs.
3. Arthritis: High dose Aspirin (75-100mg/kg in 4 divided doses), Ibuprofen 10mg/kg and proton pump inhibitors for gastrointestinal tract protection.
4. Treat the chorea with sodium valproate and carbamazepine.

Long-term follow up:

Chronic care and follow up based on RHD registries in coordination with a heart specialist or well-trained health worker with experience in treating RHD

Monthly Benzathine injection is mandatory and one should monitor disease progression with 6 monthly echocardiogram and electrocardiogram.

Decision for surgery is determined by the cardiologist, cardiac surgeon and members of the heart team discussion.

Currently, the Uganda Heart Institute is the only center in Uganda where cardiac surgery can be performed.

Prognosis

The overall outcome of acute rheumatic fever is good if identified early. Acute Rheumatic fever is exclusively preventable.

Mortality is high especially in the first year of diagnosis. Up to 17% of the patients die in the year they are diagnosed (Okello et al). Patients with poor adherence to benzthine penicillin are likely to present in congestive heart failure and worsening disease progression.

Prevention

Primordial and primary prevention are the mainstay approaches. By improving housing conditions with proper ventilation and treating streptococcal throat infections promptly.

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NCDs

Preparing frontline health workers for the growing burden of NCDs

Imagine having a stroke in a place where the nearest health facility is a two-hour walk away. And should you manage to find your way there, a trained provider isn't available to assist you. Consider what would happen if the pharmacy ran out of the insulin you needed to manage your diabetes – and all of the other pharmacies within 50km of your home were also out of supplies. This would be unusual for those who live in developed countries, but it is all too often a reality for those in the developing world, where the burden of non-communicable diseases (NCDs) such as: cardiovascular disease, diabetes, cancers, and chronic lung disease – are becoming a growing public health concern.

Unlike in the past, populations in developing countries are slowly becoming aware of the threats posed by NCDs – from difficulties in establishing a reliable diagnosis to frequent stock-out of essential medicines and related NCDs supplies in public facilities. Once the diagnosis is established, the requirements and needs for NCD care and support are lifelong and can be formidable. Recently I had interactions with members

of a local community just outside Kampala city, who strongly lamented that in Uganda, 'it would be better to be diagnosed with HIV/AIDS than with diabetes'. They said, 'we finally have the means to confront HIV/AIDS, but to be diabetic in Uganda is like a death sentence'.

The focus of this paper is on the critical role of frontline health workers in tackling the complex issues surrounding the response to NCDs. Perhaps it is important to start by defining the categories of frontline health workers of importance to communities. These categories will vary from country to country. Typically though, they include community health extension workers who may be full time, part time, or volunteers. They work mainly to maintain living standards and service packages at the community level, which in Uganda is sometimes referred to as Health Centre I; and at the Parish level (Health Centre II) and at the Sub-country level (Health Centre III) - playing a major role of connecting the households to the higher levels of the health systems.

Then there are Health Assistants, Community Development Assistants, School Health teams, Community Drug Distributors and others. These frontline health workers should be part of the health workforce with clear mechanisms for their training and remuneration; as well as career paths, motivation and how they should be supported.

Africa is not short of healthy food.

Unfortunately, the frontline health workers frequently face enormous challenges and must be prepared to adapt to the rapidly changing circumstances. One of the emerging challenges is that the growing burden of NCDs in low and middle-income countries threatens the functionality of health systems that are already weakened by various systemic factors. For instance, in many countries health systems – and health workers – have not been prepared to address the complex nature of NCDs. Health systems are often fragmented, and designed to respond to single episodes of care or long-term prevention and control of infectious diseases.[1] Many countries also continue to face shortages and distribution challenges of trained and supported health workers. As most NCDs are multi-factorial in origin and are detected later in their evolution, health systems face significant challenges to provide early detection as well as affordable, effective, and timely treatment, particularly in isolated underserved communities.

We also realise that for the past several decades, global health programs have focused on infectious diseases including HIV/AIDS, malaria and tuberculosis. This was rational and based on the burden these diseases placed upon all countries. And, although there has been progress against some of these illnesses, there remains much more to be done.

In the recent past other diseases including cancer, diabetes, chronic heart disease and chronic lung disease are overwhelming health systems in many countries. The World Health Organization (WHO) estimates that these four diseases account for more than six out of every 10 deaths.[2] Just as astounding, NCDs are occurring with greater ferocity among the poorest of the poor, and among younger populations, perhaps because of rising global urbanisation and changing lifestyles.

There is now a solid body of knowledge available on strategies that can help prevent NCDs, a great deal of which can be done at the local level. Prevention strategies, such as support for tobacco cessation and decreasing alcohol consumption, and reducing barriers to physical activity and healthier eating can stop people from getting sick in the first place. Equally of importance is paying attention to social determinants of health, including poverty, education and shelter, which can also help. There are also relatively inexpensive ways to diagnose these illnesses and treat most NCDs if caught early.

While evidence on the role of frontline health workers in addressing NCDs is insufficient, available data indicate that they can have a positive impact on the prevention, management, and control of NCDs. Existing research demonstrates that front line health workers who have appropriate training, supervision, and support can carry out a range of activities to help prevent, control, and manage NCDs.[3] These activities include raising awareness and promoting healthy behaviors, conducting screenings of individuals and households at risk; monitoring symptoms; administering and managing medication; providing referrals to a health facility; responding to time critical events, and supporting follow-up after acute events.[4] providing follow up monitoring and care; and tracking health outcomes. Front line health works should be part of how communities are governed and should promote inter-sectoral collaboration on matters of health.

The roles of doctors and nurses in the leadership of healthcare interventions is critical, but there are also important roles for community health workers, clinical officers and other cadres of workers at every level of the health system, from community clinics to tertiary hospitals. Community health workers, if properly oriented, can identify risk factors and offer counseling on behavioral changes to prevent chronic illness, improving population health while leaving doctors and nurses

to focus on patients with more acute or complex health conditions.

With appropriate training, community health workers can screen for and diagnose the disease so that it can be treated early, leading to better health outcomes.[5] More needs to be done though, to improve the number of health workers who are equipped to prevent, screen, diagnose and treat NCDs. And more critically, efforts must be made to integrate NCD screening, prevention and treatment into existing health services, such as those for maternal and child health and HIV/AIDS. Fortunately, to address the increasing burden of chronic disease, many health systems are adapting existing models of care or implementing innovative approaches to screening and prevention using mobile clinics and mobile technology.

In Uganda the skills sets necessary for front line health workers are well defined in the basic package of health services,[6] and include:

- Mobilisation skills to improve the health of the people.
- Awareness of the causes of NCDs and how to educate the population on health literacy – for health promotion and disease prevention.
- Advocacy skills, especially to address the risk factors to NCDs - low salt diet, alcohol abuse, tobacco use, lack of physical exercise and information on proper nutrition.
- Creating awareness on vaccination for prevention of NCDs: e.g. human papilloma virus vaccine for prevention of carcinoma of the cervix and hepatitis vaccine to prevent liver cancer.
- Addressing the dangers of alcohol and smoking in rural areas.
- Assessing various population groups by age on the risks for NCDs.
- Screening skills for common NCDs – being able to check blood pressure, blood sugar, weight measurements, breast self-examination, measurements of mid-arm circumference to detect malnutrition in children, etc.
- Recognise and refer complex conditions, and generally supporting systems for prompt referrals
- Births and death registration; and collection of basic data on NCDs in the community.

With these skills, the front-line health workers should be able to create an environment which enables people to live as healthy as possible. But to do this, they have to confront many societal challenges. In many settings, the rise of NCDs in low – and middle-income countries is linked to drastic changes in life styles and harmful habits – such as cigarettes smoking, alcohol abuse, and a huge appetite for highly refined sugar rich beverages and foods. These habits are further confounded by the world's increasing capacity to produce, process, and trade food; accompanied by important changes in dietary patterns across nearly all countries of our sub-regions.

As a result of aggressive marketing of highly refined drinks and foods even to remote communities, there has been a sharp rise in non-communicable disease burdens which is imposing high human, social, and economic costs to the populace. Increasingly these countries are becoming disproportionately affected by rapidly rising rates of non-communicable diseases in younger populations that deteriorate health and strain economic resources for all. Front line health workers must be prepared to reach out to individuals, families and communities; to provide information on the dangers of unhealthy diets, defined by the quantity, quality, and diversity of foods consumed. Our communities must also be persuaded to stick to diets based on fresh and minimally processed foods which have numerous health benefits for individuals, and communities; including disease prevention effects, lower healthcare costs, and more productive societies.

But it is also important for efforts at community level to be reinforced by innovative policies and community- and market-oriented solutions which can improve dietary quality and diversity, offsetting an increasing reliance on ready-to-consume, ultra-processed food and drink products that are nutritionally poor.

The Uganda Basic Package of Health Services is a standard or guidelines used by Health Care providers, administrative and political leaders and the communities themselves as realistic targets that can be achieved. Supervisors at the Ministry of Health and at the district levels also find this document a very useful tool for measuring the performance of health services.

But, none of these efforts will close the gap if there isn't a concerted movement to increase the number of health workers (including front line health workers) in resource-poor settings and build local capacity to meet the health needs of people in even the most remote hard-to-reach communities. Existing health workers are too often over-burdened and under-resourced.

In addition, weak infrastructure in the public sector demand greater investments from donors, multilateral agencies and national governments alike to develop more efficient mechanisms for managing supplies and medicines as well as building local capacity to provide care. It will be impossible to make adequate gains toward reducing the burden of NCDs, much less achieve universal health coverage, without the right numbers of well-trained and well-resourced health workers where they are most needed. It is time to do more.

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