KESHO
Kenya Society of Haematology & Oncology

REPORT OF SYMPOSIUM ON
"CANCER RESEARCH IN KENYA"

A VIRTUAL SYMPOSIUM HOSTED BY
KENYA SOCIETY OF HAEMATOLOGY AND ONCOLOGY (KESHO)

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EXECUTIVE SUMMARY:

The Kenya Society of Haematology and Oncology (KESHO) organized a virtual symposium on the topic of "Cancer Research in Kenya" on 26th February 2022. The symposium attracted over 400 participants not only from Kenya and Africa but also from other parts of the world. The participants ranged from doctors (from general practitioners to oncologists, surgeons, haematologists, etc.), nurses, scientists, pharmacists, students, and researchers from various areas of research related to cancer.

There were six panellist speakers who highlighted the need for research, research infrastructure and shared opportunities to get involved. The participants were asked to leave comments. The event lasted about 3 and a half hours and ended with a panel discussion with the speakers and the audience. During the panel discussion, the questions asked by the participants were discussed. In general, the talks and discussions revolved around doing local research, publishing it locally, and addressing the local issues with tips from the international arena. A detailed version of the talks of the speakers is included in this report, along with their biographies in the end.

OPENING REMARKS

The symposium was moderated by Dr Miriam Mutebi, who is a Consultant Breast Surgical Oncologist and an Assistant Professor in the Department of Surgery at the Aga Khan University Hospital (AKUH), Nairobi, Kenya.

She greeted the participants and thanked them for joining from different time zones. In her opening remarks, she talked about the rising cancer burden in Africa. She highlighted that although the cancer incidence may seem to be lower than other countries, the incidence to mortality ratio is comparatively higher. By 2030, at least three-quarters of deaths will be coming from low- and middle-income countries (LMICs), including Sub Saharan Africa.

She highlighted the differences in African healthcare from the rest of the world. Anecdotally, we know that we are seeing different disease patterns i.e., our patients are much younger than those reported in the literature for different parts of the world. Likewise, they may not respond as effectively as others to the therapies we are giving.

Bringing the attention of the audience to the importance of research, she said that basically, such an observation of the disease variation underscores the importance of doing a deeper dive into the patterns of disease that we are seeing. We need to find out what are the challenges. We know that the patients with advanced disease and quite a number of people in our population do not often complete their care. We need to find out the reasons behind that and these variations. It all circles back to the importance of research.

She informed the participants that research has not been well-highlighted in the continent. In 2012, there was a commitment from the governments of African Union countries to dedicate at least 1% of the GDP for research. That 1% is not just for cancer research but also across the board for health research, although that commitment has not been met until now.

At the end of her opening remarks, she left the audience with some questions to ponder. If we look at different players including oncologists, academia, and other providers along the cancer care continuum, how do we collectively answer the questions that we want to answer about our patients? How can we, through research, help to impact care?

She then invited Prof Nicholas Abinya for the very first talk to give an overview of basic research infrastructure and how it relates to the patterns and constructs created by academia.

WHAT IS BASIC RESEARCH INFRASTRUCTURE?

BY PROF N.A.O. ABINYA

Prof Nicholas Abinya is a consultant medical oncologist at Nairobi Hospital and a former Professor of medicine at the University of Nairobi. He is one of the founding fathers of KESHO. He also initiated the medical and clinical oncology programs at the University of Nairobi. You can find his full biography at the end of this report.

Speaking on the basic research infrastructure, Prof Nicholas said that in Kenya and Africa in general we are still living in history in terms of research. Given below are the very initial contents of his presentation:

- Definition of research: the systematic investigation and study of materials and sources to establish facts and reach new conclusions
- Types of research (theoretical, applied, exploratory, descriptive, explanatory, qualitative, quantitative, and experimental)
- Qualification of a researcher: one needs a tertiary qualification or work experience that is recognized in a related field (i.e., a scientist, a don [university teacher, top man], or a scholar)

The Professor then moved on to answer a critical question in the rest of his presentation; why do people do research? He showed the audience a picture from an 18th Century English school and pointed out that a lot of classrooms in Africa today will look that, or even worse in terms of infrastructure, although a few may be better.

Showing another picture to highlight the historical domain, he recalled his Chemistry class where the experiment of Joseph Priestly was quite a common topic. Priestly, in 1774, obtained 'dephlogisticated air' (or oxygen) by observing a mouse thriving in an environment and a candle flaming more where the red mercurous oxide is heated. He did not have the luxury of sophisticated or complicated infrastructure besides kitchen utensils (a glass and a plate). This discovery was driven by curiosity.

He informed the participants that even in those days, there was networking among the researchers. Priestly went on to a tour of Europe with his patron, Shelburne. In Paris, Priestly met a French researcher, Antoine-Laurent de Lavoisier and informed him how he had obtained 'new air'. Lavoisier then carried on the experiments further and had a little better equipment than Priestly but even that was not any complicated infrastructure at that time in history (late 18th century).

Prof Abinya stated that the discovery of research is neither for geniuses nor for fools. The only person in the research space to be termed genius was Ernest Brown Rutherford. Born in New Zeeland and spent time at Cambridge doing research, he discovered that most of the atom is empty surrounded by tiny electrons.

The speaker showed the audience the photos of the laboratories where Rutherford and J. J. Thomson (who discovered the electron) worked that those labs did not have any complicated infrastructure. Although they look messy, most of the things in those labs would be readily available here in Africa. The only thing they had was the recognition and the encouragement (i.e., the title of Sir) along with the environment where they work. In our setups, the musicians are better off in terms of recognition whereas the researcher may not find it that better.

The Professor continued to show examples of other laboratories in history to make his point about the infrastructure in ancient times. If we see the pictures of the laboratories of Pierre and Marie Curie who discovered radioactive materials and their radioactivity, they also don't have any sophisticated infrastructure, compared to the modern-day labs. If we compare the ancient and today's Cavendish labs (which replaced the old labs that were contaminated with radioactive material), we can notice a remarkable difference. A lot of Nobel prizes were won in those ancient laboratories that are like what we have in Africa today.

How did Miescher discover DNA? Prof Abinya asked the audience. In 1869, Johann Friedrich Miescher discovered it using the pus-soaked bandages which he collected for studying white blood cells. He simply filtered pus for white cells and looked at the nucleus, ultimately getting DNA. Those bandages were collected from local surgical units. A lot of people would stay away from doing that. It was because of his interest. A lot of work followed this basic discovery, ultimately leading to the discovery of the double-helix structure of DNA in 1952 by Francis Crick and James Watson. The two scientists won a Nobel Prize, along with Maurice Wilkins in 1962. Francis went on to develop the central dogma of molecular biology. That has led us to understand the genes, and their link to diseases, and other areas of biology.

Sharing more examples, Prof Abinya pointed out the work of Thomas Beatson in the 1880s, who took interest in the relation between the production of milk in the breast to the ovaries. He observed that milk production stopped in rabbit breasts after the removal of ovaries. Later, he showed that oophorectomy even also helped in advanced breast cancer. Half a century later, a urologist at the University of Chicago, Charles Huggins, showed that the metastasized prostate cancer regressed. Again, this did not require any complicated laboratory or infrastructure. It was mainly observation taken to some small simple experiments.

The Professor reiterated that those historical scientists did not need any complicated atmosphere or big salaries to carry out that kind of scientific work. All they needed was their passion for work. Presenting another example, he highlighted the importance of statistics and observation. A virologist, Zur Hausen, who found out in 1983 that HPV could cause cervical cancer, won a Nobel prize in 2008 for his work. But how did this come about? It was well-known statistics even at that time, and even from the 1800s that cervical cancer was common among sex workers, those with multiple sexual partners, and the subsequent wives of men whose first wives had died from cervical cancer. Also, it was rare in nuns (except for those who had been sexually active before entering the convent) and in Jewish women.

Hausen was originally looking for HSV in cervical cancer samples. This, of course, needed some laboratory work, but he did not find it. He observed that people with genital warts (known to be caused by HPV), often developed cervical cancer. Resultantly, he turned his research towards HPV in cervical cancer and published a theory in 1976 that it is HPV, not HSV, that caused cervical cancer. The speaker informed the audience almost all these discoveries faced a lot of challenges. People abused them and said that they published no rubbish. However, those findings persisted and were shown to be true and useful (and are serving us even today!).

In the case of Hausen, the subsequent experiments proved his theory correct. He, himself, demonstrated it in 1983 and showed that the genes from the virus are incorporated into the DNA of the host cell. Subsequently, HPV has been shown to cause anal, penile, vulvar, vaginal, and nasopharyngeal cancer. The professor reminded the audience that it all started from some very simple observations.

After giving the audience a burst from history, the speaker turned their attention to the current scenario. The research output in Africa is still very low; that in numbers is less than 4% of the global research output. Where the research is conducted, it is funded by the US National Institute of Health (NIH) through agencies in Europe, and maybe Japan. Asking the audience, Professor raised the question that what prevents research to be carried out locally. Is it that here most people are still looking for basics while others appear to be swimming in wealth? Is it the stupid environment or stupid occupants that stops research from being done locally?

Prof Abinya shared his observations to the audience along with his inferences. Displaying a photo of the earth's climate zones, he informed the audience that he observed that a lot of discovery and innovation has taken place in the temperate zone compared to torrid and frigid zones. Why is it so? Prof presents two possible reasons: diverse weather patterns, and the horse. For weather, he showed the audience a photograph of a person breathing in Winter in temperate zones as he would have a little white cloud of exhaled air very visible to others.

He continued to explain that if a person standing next to someone who is coughing also starts coughing, that would lead to a quick observation motivating someone to go to a laboratory and find out what caused that coughing to transmit from one person to another? In tropical areas, it would be difficult to see what someone is breathing in or out. For horses, it is easier to relate that as a means of transportation, mainly found in temperate zones. It is easier for people to travel to other places, see what is happening, relate with other people, share ideas, and come up with new theories.

The Professor then brought the attention of the participants the issue of lifestyle. Here in Africa, somebody who just graduated from medical school would aspire for a luxurious house and car that a top professor or consultant has. This makes it very difficult to concentrate and investigate areas like research. Now showing the picture of a cartoon representing cancer, the speaker asked the audience how could we kick the ass of cancer when we are not equipped? He answered that we could possibly do it through theoretical research. Whatever Albert Einstein discovered and suggested using basic arithmetic calculations is being discovered with some of the most complicated electronic telescopes that we know today.

The speaker continued to explain to the participants that people talk about funding, and encouraged the audience to look at a picture of a gathering of people in the UK raising funds for cancer research. The lack of funds is still an issue. But does it matter? What is the basic cancer research infrastructure that we need? It is your office. It is your laboratory, your clinic, or your ward – wherever you work. At the end of the day, what drives you to do research is your passion and interest.

"If you have that big house and car in mind," prof said. "I don't see you doing any research unless you have big funding". He said that nobody is going to give you funding unless they see your passion. He ended his talk with a picture showing networking among researchers, highlighting its importance. Dr Miriam thanked Prof Nicholas Abinya for his insightful talk.

WHAT IS A COMPREHENSIVE CANCER RESEARCH INFRASTRUCTURE?

BY PROF NAZIK HAMMAD

Prof Nazik Hammad is an Associate Professor of Medical Oncology at Queen's University, Ontario, Canada. She is chair of the educational training committee African Organization in Research and Training in Cancer (AORTIC), and a visiting professor at the University of Nairobi, Kenya. Her full biography is given at the end of this report.

She started her talk by presenting some statistics. By 2040, almost 67% of the cancer cases will be in LMICs, whereas less than 4% of the total annual output (publications) are co-authored by individuals from LMICs, as also shared by Prof Nicholas. Likewise, almost 70% of the deaths from cancer occur in LMICs,

and only 5% of the resources spent on cancer worldwide are spent in LMICs – highlighting a big equity gap. "So, what do we do about cancer? We intervene", she said.

She showed the participants a flowchart of intervention starting from prevention, screening, diagnosis, and all the way to end-of-life care. She stressed that these interventions should be supported by policies, legislation, regulations, and programmes. The interventions should be operationally and economically feasible given the state of the health system. They should be intervention-based, i.e., the best available evidence for screening, diagnosis, and treatment. This is where research comes in. Even with the most feasible evidence-based interventions, it is necessary to make sure that these are accessible to the disadvantaged and vulnerable populations. To assess that, we also need to do research to see if interventions are equitable as well as evidence based.

The speaker then spoke on the basic infrastructure needed to achieve the above. We need to develop cancer registries and health information systems that collect standardised data which is comprehensive and accurate so that decision-makers can make informed and evidence-based policy decisions. It is, however, important to consider where the research is done; who pays for it; what type of research is done, and who is carrying out that research.

Referring to the talk of Prof Nicholas, she expanded on the answer to where is the research to be done. Traditionally, it is governmental cancer research institutes, universities, cancer centres, hospitals, cancer societies, pharmaceutical companies, private labs, and provincial/state/county agencies. Highlighting the research infrastructure of high-income countries (HICs), she informed the participants that there are four main cancer research centres in the UK that receive about one-third of research spending, funding more than 120 research groups. They also have 15 translational research centres which drive collaborations between the universities, hospitals, and other research organizations.

Likewise, she shared the details of the US cancer infrastructure. Designated by the National Cancer Institute (NCI), they have 51 comprehensive cancer centres, 7 basic laboratory cancer centres, and 13 other cancer centres, totalling the number to 71 NCI-designated cancer centres. She involved the audience in thinking about what kind of cancer centre should we have, that will be able to carry out research in LMICs. They should be multidisciplinary and can either be stand-alone or part of a hospital complex. Hopefully, they do a full range of cancer care plus prevention, research, training, and education, locoregionally or nationally.

Likewise, they are often subject to national and international accreditation processes (such as NCI-designated centres). She said that those cancer centres should have a system that is affordable, equitable, and high quality for providing cancer care, education, and research. For that purpose, you need many driving forces to support a cancer centre, including market forces, treatment sourcing, trained workforce, guidelines, research, political will, geographical, topographical, and conflict considerations to a few names.

Answering the next question (who is carrying out that research), the speaker said the designations may be important for the allocation of resources but are they essential for the functioning? It is important to consider that by whom would those designations be defined, and for whom and by which criteria? The next question big question is who pays for the research. She shared a pie chart on the global funding of cancer research, which showed that about 49% of research funding comes from non-profit organizations,

12% from the government and about 21% is contributed by academic facilities and networks. The speaker drew the attention of the participants to the part of spending by international and intergovernmental organizations, which is just 1%, although the hype or perception may be higher.

A comprehensive list of organizations can be found at the website of the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) - https://www.iarc.who.int/list-of-institutions-funding-cancer-research/. Data from that website for Kenya and Nigeria was shown, where Kenya only have one entry, that is for the National Cancer Institute of Kenya. In contrast, Nigeria has many organizations doing cancer research but most of them look like foundations or societies, and not government bodies.

Referring to a recent publication by Noor AM (2022), the speaker reminded the participants that most of the global research funding goes to institutions and individuals in high-income countries, even for work done in low-income countries. Such evidentiary knowledge and control over funds create power asymmetries. It leads to a culture of data and information peddling that is delinked from the lived experience and doesn't speak to the rightful owners and users of this information, which is a recipe for poor policies and health outcomes. Likewise, shared the findings of another research study by a group (Wells, Sharma, Paggio, 2021) who showed that the randomized clinical trials (RCTs) from LMICs are more likely to identify effective therapies and have a larger effect size than RCTs from HICs.

Based on these findings, she said that we need to have our research so that we can have an outcome that is suitable and more informative for our settings. In her opinion, there is no substitute for local funding. Although international grants and partnerships may be helpful to some extent, they will never bridge the gap in research capacity in LMICs. We, thus, must do a lot of advocacy and we must gather a lot of political will to have our own funding.

The next part of the answer for the comprehensive cancer research infrastructure depends on what type of research is to be carried out (i.e., cancer biology, genomics, causes, prevention, diagnosis, disparities, childhood cancers, etc.). She shared that at her patent institute, Queen's University, they have an integrated research centre, namely 'Cancer Research Institute', which comprises of three components: Cancer Biology and Genetics, Canadian Cancer Trials Group, and Cancer Care & Epidemiology.

She said that we need to set our priorities on what kind of research we do. American Society of Clinical Oncology (ASCO) has been doing that for the last several years. Every year, they publish their 'advances in cancer' report. She shared a few examples from the 2021 and 2020 reports with the audience. In 2021, they added artificial intelligence and deep learning to cancer research. Another way to set priorities is that of the Institute of Cancer Research, Canada, where they have 5-year strategic plans.

Likewise, Cancer Research UK sets goals for several years and they measure and aims for achieving a certain percentage of that goal (i.e., for improving 10-year survival). They have different approaches for achieving those goals which may help us to set our priorities. It is good that currently there is a lot of discussion going on in AORTIC as well as individual countries to set priorities for cancer research. The speaker appreciated such efforts and said that these discussions will guide us better.

The next tenant in the infrastructure is who is going to do the research. That is the ultimate resource. A research team can be quite big, and everyone can be part of it, i.e., clinician-researchers, basic scientists,

epidemiologists, social scientists, biostatisticians, research coordinators, data managers, health economists, psychologists, project managers, etc. The team can be multi-disciplinary, or trans-disciplinary.

The speaker told the participants that there has been a lot of interest in cancer research competencies. We are doing a lot of training for clinicians using clinical competencies. Attempts are being made to distil the competencies, such as developing research ideas, study design skills, ethics, data collection, networking, data analysis, manuscript writing, science communication, balancing other commitments, identifying clinical needs, etc. In her opinion, the following are the most important skills:

- Career development skills (early, mid-, and late-career) – where you are heading, what are your goals, and what are your plans to achieve those goals?
- Knowledge translation (KT) skills – it demands that you have knowledge (understanding, awareness, sharing, quality improvement methods, tools, etc.), skills (leadership, collaboration, knowledge synthesis, dissemination of skills, project management, information technology, etc.), and the right attitude (confidence, trust, integrity, commitment, valuing research, teamwork, professionalism, ethics, behaviour, interest etc.)
- Finding a mentor/mentors and being a good mentee

She discussed various barriers faced by the research trainees in LMICs. A few of these are lack of mentorship, lack of funding, and inadequate consideration of family and work-life balance in available research training programs. We need to invest in mentor training. The Mentors need protected time to guide mentees and facilitate the development of research skills (i.e., strategies for communicating questions and ideas and scientific conduct topics such as engaging with peers and senior faculty).

Referring to Prof Nicholas's input on 'why we have low research output', she added high workload, low salaries, lack of time or interest to do research, and undervaluing of teaching and education, to be a few of the reasons. It is important to value the educators because they are the ones who are going to train the next generation of researchers and instil in them the love of knowledge and discovery.

She also highlighted the adversity of the high workload on quality of research and said that it puts the researchers at a disadvantage in terms of knowledge production. They can get trapped in the foreign gaze, where they do work for others, not for your community. It prioritizes the research agenda by the global north and further entrenches power asymmetry. To address that, we should encourage clinician researchers as well as the clinicians and clinician educators. They should be valued and compensated. She encouraged the audience to focus on meaningful research that adds value, rather than producing a huge number of publications.

To further explain, she said that if we look at the research ecosystem, it is dominated by basic science and biopharmaceutical agendas. These agendas are set by HICs and the private sector with little recognition to health systems. She gave an example of the US cancer moon-shot program started in 1971 by former President Richard Nixon, which aimed for cancer to be cured in 5 years. Then, in 2016, then-vice-president Biden declared that the moon-shot would achieve ten years of cancer research in only five years. She encouraged the participants to follow that debate and shared another initiative to follow, cancer ground shoot. It was presented by Dr Gyawali who called to focus on ensuring access to available treatments rather than hunting for the next cure.

"All the fuss was about how wonderful the new innovations will be," he says. "But that did not acknowledge the fact that we already have so many interventions in oncology that we already have proven to work, and most of the patients of the world don't have access to these treatments."

She stressed that there is potentially high impact but neglected research i.e., Health services research, quality improvement research, Patient outcome research, educational research, and incorporating qualitative research. She pointed out that this type of research doesn't require a lot of infrastructures. For example, if you want to find out if the cancer patients in your department are getting chemotherapy in the last three weeks of their life, that is a very good metric. This could be an easy project and can tell you volumes about the way we deliver cancer care. In education, we can research the way we train; are we training well? are there things that we should not be doing? And so on. Likewise, we can assess whether we are incorporating enough qualitative research in our studies so that we enrich the data.

Another important aspect of infrastructure is 'where to publish'. In the speaker's opinion, publishing locally is the best option. Quoting from Abimbola's paper, she asked why should it be normal that a trial of strategies to reduce maternal mortality in rural India gets published in a journal based in Boston or London instead of Bangalore? We must rethink the culture of worshipping elite journals with high impact factors. Some of the most important milestones in global oncology do not make it to high impact journals. There are ways of knowing and sense-making that may not make it to high impact peer-reviewed journals which are often not read in LMIC.

"Local publishing should be the norm", she hoped that it to occur in the next 5 years (hopefully not 10 years!) when African researchers would publish in African journals and KESHO would have its own journal. Perhaps, we should extend our authorial reflexivity, so that it includes the justification for the choice of a foreign journal—for example, because it is a multi-country study, the findings are irrelevant to a local audience, funder's expectation, the journal's impact factor, or for promotion, grants, and prestige. She reiterated that local ownership is very important. She shared the statement published by Noor et. al. (2022) that the real power of data is in its ability to change minds and lives and you must, therefore, communicate it clearly and simply, tailored to the right audience.

At the end of her talk, Prof Nazik appreciated KESHO by saying that it has become a force in advancing the art, science, and practice of oncology nationally, regionally, and continentally. It has a bright future in the strengthening of research and facilitating dialogue and exchange of ideas. She showed her picture from a 2018 event of KESHO and said that it has always been a pleasure participating in the events.

The moderator, Dr Miriam thanked her for such a wonderful talk highlighting the real and pragmatic overview of the infrastructure required.

HOW CAN WE CREATE A RESEARCH-FRIENDLY ENVIRONMENT IN KENYA?
BY DR PETER OMONDI OYIRO

Dr Oyiro is a Lecturer at the University of Nairobi and is also a Consultant Physician and Medical Oncologist at the Kenyatta National Hospital, Nairobi. His full profile is available at the end of this report.

Dr Oyiro's talk spanned over the following topics:

- Economic analysis of the country
- The country's structure with a direct and indirect effect on the research system.
- The policy framework for research
- Relevant relations between research actors in Kenya.
- Assess research performance in the country.
- Explore research production by assessing research inputs, research culture and support, and research outputs.
- Assess research diffusion.
- Constraints affecting the research system/discuss opportunities to strengthen research capacity.

He started by sharing the economic analysis of Kenya. The country has a population of ~54 million, a GDP of ~227 billion USD, and a GDP per capita of 1,710 USD, as of 2020. Based on these statistics, it is a lower-middle-income country. There is quite a high level of poverty in Kenya i.e., about 37% of the population live below the level of poverty (1.9$ a day). There is quite a large rural population, 73% of the total. The literacy level is 79% which is lower than the global average.

The speaker added that Kenya is a social and political economy, performing very poorly on global indices. We are at number 142 in the composite human development index. Likewise, we rank 91 out of 137 countries in the global competitiveness index. This includes several things, about 117 indicators, including research and research output. Similarly, our rank for current technology readiness and level of innovation is low. In contrast, the score for capacity to innovate is 4.3 out of 7 which indicates a relatively high economic dynamism and a positive outlook for growth.

Dr Oyiro shared with the audience that Kenya has a national research policy, which is quite a mature policy framework. It has ambitious objectives for research and innovation, but the main impediment is its implementation. Its institutional framework for research relies on the National Commission for Science, Technology, and Innovation (NACOSTI), the National Research Fund (NRF), and Kenya Innovation Agency (KENIA). If the three agencies work together optimally, we would have very good research progress in the country. They have clear mandates but lack the financial capacity for implementation. Kenya also hosts international and intermediary research organizations making it a major hub for research in East Africa.

He shared with the audience the details of national institutions for research. NACOSTI is supposed to:

- develop national science, technology, and innovation (STI) projects
- to lead inter-agency efforts to implement the policy
- accredit research institutes and grant licences to undertake research, to decide funding priorities
- decide on funding priorities
- develop, and enforce relevant regulations and monitor progress in STI.

The speaker appreciated that it is good to see that the government is at least rolling some funds for research. Besides NACOSTI, there are advisory research committees (ARCs) that advise NACOSTI on the programmes and projects required to implement the priorities identified in the national STI policy. ARCs also maintain a database of existing research programmes, projects, and facilities.

Kenya Innovation Agency (KENIA) institutionalize the relationships among research actors and non-research actors (i.e., funders). KENIA is supposed to designate the centre of excellence and should disseminate scientific knowledge or technology. It is also designated to

KENIA institutionalize the relationships among research actors and non-research actors (i.e., funders). It is supposed to designate the centre of excellence and should disseminate scientific knowledge or technology. It is also designated to develop the national capacity and infrastructure to protect and exploit intellectual property (IP).

NRF awards research contracts, grants, and fellowships. It finances the acquisition or establishment of research facilities and supports research capacity building across the country. The research stakeholders within Kenya do not seem to operate in a coordinated fashion. There seems to be some disconnect between the national research policy and the research policies of the universities which is attributed to the lack of an implementation roadmap at the national level.

In terms of human capital, we have 225 full-time researchers per million of inhabitants. Comparatively, South Africa has a better ratio (493 per million), but Kenya relatively better ratio in the East African region. We have very low PhD level qualifications or equivalent, 32% of academic staff have doctoral level qualifications where the ratio is 6% if we consider all the R&D staff working in government, private sector, non-profits, and academia. In general, 60% of researchers are employed in higher education, and 20% in government.

The speaker showed his concern for the quality of education and research based on the above facts. He shared that a 2014 directive issued by the Commission for University Education stipulated that the lecturers had to obtain a PhD qualification by November; that may make the situation better. He, then, expanded on the gender disparity in human capital for research. Only one in five researchers are female which is quite comparable to the situation of Ethiopia (13% of researchers). We lag behind the African average of 31.6% female researchers. In Sub-Saharan Africa, South Africa is the only major country with a proportion of female researchers comparable to high-income countries (44.6%).

He shared the initiative that would benefit Kenya's research environment and that would support its national capacity. The very first initiative is to support implementation capacity across national institutions. It is important to Improve government effectiveness as that appears to be a key opportunity to push the research agenda. He added that building capacity among funding councils (NRF), policymakers (NACOSTI), and intermediaries (KENIA), is crucial. The support should be targeted and focus on implementation problems identified by the beneficiaries.

The second initiative needed, as shared by the speaker, is to promote research quality. There is a need for mechanisms to evaluate the research quality and to increase NACOSTI's capacity to monitor research quality. It is crucial that research should be valued for its contribution to the economy and society and is not promoted as a vehicle for leveraging external funding. 'Research quality' should be defined by stronger links to development objectives over publication or citation-based notions of scientific excellence.

Dr Oyiro talked about the third initiative to be strengthening the role of national intermediaries. The national stakeholders such as Kenya Medical Research Institute (KEMRI) can play an important role in

bridging the gap between research and policymakers. Government-funded think tanks play a much more central role in Kenya than they do in high-income countries, but they are often limited by lack of funding and capacity. These intermediaries can help create a platform for research to influence policy and practice, and their work has the potential to elevate the importance of research among policymakers. He added that they should be central in the dissemination of evidence rather than promoting their own research.

The speaker informed the participants that research in Kenya suffers from underinvestment from national governments across the continent. NACOSTI recommends that institutions should spend at least 2% of turnover on research. The research production can be increased by improving research training at universities, increasing incentives to perform high-quality research, improving the research infrastructure, and enabling the environment for research. It is worth noting that Kenya has a large network of research organizations, comprising 31 public universities and 30 private universities. Every university is expected to have some research activity, but capacity is limited, with a focus on learning and teaching. The World Economic Forum ranked Kenyan scientific institutions 45 in the world (out of 137 countries), only behind South Africa.

Kenyan government is yet to fully understand how to realize the socio-economic value of R&D. The government to be a more convinced user of research to stimulate demand for impactful research. The key challenge appears to be the lack of mechanisms to promote accountability in policy implementation, e.g., via data collection and review of research performance, quality, standards, ethics, etc. The lack of accountability for the use of research funding appears to have undermined incentives for research production.

He explained that effective incentives for research production would improve research quality. The expectations of research production are seen as unrealistic and unfair with inadequate research infrastructure and the competing demands from the education agenda. There should be a system for incentives for universities and social actors to engage in knowledge exchange activities. Lack of both push and pull factors for research hamper the development of a national research agenda for sustainable development. The speaker stressed the importance of encouraging pharmaceutical companies to support research.

Dr Oyiro brought the attention of the audience to the fact that university-level processes, systems, and governance structures for supporting research are rarely in place. Research support roles and funding are embedded in research projects, and they do not exist as a standalone activity. Most programs focus mainly on strengthening academics' skillsets more than the skills of staff in administration, library, and ICT – hence researchers end up managing grants with little to no support from their institution.

Sharing the statistics of publishing in Kenya, he said that we have a relatively high production of academic literature, compared to other Sub-Saharan countries. In 2018, a total of 3,209 scholarly papers were published in Kenya, equating to 64 publications per million people. However, this contribution is only 0.1% of the total global output. Sharing another metric, he added that on average, almost 50% of the papers published in the last five years were open access. The average publication received 18.59 citations in the 1996-2018 period. Kenya ranked 51 out of 236 countries by the number of citations per publication. Likewise, Kenya's h-index (which measures both the productivity and citation impact of scientific publications) ranks it 54/236 countries.

He further added that this is in the context of a broader pattern of international collaboration, which accounts for over 80% of all publications recorded. International collaborations play a key role in the international dissemination of local research. However, there is a lack of strategy for knowledge exchange to enhance knowledge transfer practices. Also, a good system for intellectual property protection is missing. The universities lack the capacity or incentive to perform knowledge exchange activities. Research uptake by the government and other actors is very limited.

Towards the end of his talk, he discussed several priority actions to be taken, as listed below:

- Establishing a national population-based cancer registry.
- Strengthening existing population-based cancer registries and establishing cancer registries at cancer centres.
- Integrating cancer risk factors, screening, awareness, and care indicators in national health surveys.
- Enhancing the cross-border, interdisciplinary and/or discipline-focused networks when they allow LMICs to take the lead in developing collaborative proposals
- Establishing facilities for clinical trials
- Ensuring that accurate data and characteristics of cancer patients are obtained in a timely manner and utilized for surveillance and planning.
- Improving and strengthening medical records services in cancer treatment facilities to facilitate improved capture of information and routine coding of cancers as per international standards
- Allocating funds to promote population-based and clinical cancer research to inform policy and practice.
- Establishing a budget line for cancer research, and generating priority research areas
- Establishing a well-coordinated information-sharing mechanism between all stakeholders

He concluded his talk by saying that Kenya's research system is deficient but not undeveloped. The country has many established international players with existing long-standing relationships with local stakeholders. It also has an established layer of national policies and institutions that, whilst under-resourced, are significant actors domestically. Organization-level interventions without system-level changes to policy, incentives and capacity seem unlikely to produce long-term impacts.

Dr Miriam thanked Dr Oyiro for an excellent overview of the state of research in Kenya. She agreed that we should take it as an opportunity to coordinate all the players and work on our research culture. It is important to realize that research is incremental, and every single paper adds some value. The lecture was followed by a brief tea break before the next lecture.

CLINICAL CANCER RESEARCH EFFORTS IN KENYA

BY DR SITNA MWANZI

Dr Sitna Ali Mwanzi is a Consultant Medical Oncologist working at the Aga Khan University Hospital, Nairobi. Her full biography is included in the last section of this report.

Dr Sitna started her talk by defining clinical research. It is a component of medical and health research intended to produce knowledge valuable for understanding human disease, preventing it, treating

illness, and promoting health. It is a continuum of studies involving interactions with patients, diagnostic clinical materials or data, or populations. Few examples include bi-directional integrative (translational) research, disease mechanisms (etiopathogenesis), clinical knowledge, detection, diagnosis and natural history of the disease, therapeutic interventions including development and clinical trials of drugs, biologics, devices, and instruments, prevention (primary and secondary) and health promotion, behavioural research, health services research, including outcomes, and cost-effectiveness, epidemiology, community-based and managed care-based trials.

Expanding on cancer research efforts in Kenya, she brought the attention of the participants to the fact that there is no central repository of cancer research. It makes the search difficult as there are several ways to find out published data is to use search engines, PubMed/Medline, Embase, Scopus, Global Health, Google scholar, or direct search of journals. There exist government documents as well as unpublished data like thesis and dissertations.

She shared with participants the result of her search on PubMed for cancer research using different keywords, between 2002-2022. It was worth noting that the number of publications increased significantly in the last few years. Citing two key publications, she encouraged the participants to read them for getting an idea of cancer research efforts in Kenya and Africa. The first publication is a scoping review of oncology research in Kenya by Manduku et. al. published in the Journal of Cancer Policy in 2020. It included the published and unpublished data between 2007 and 2017.

The researchers used PubMed, other search engines, and other sources to find out a total of 1,727 papers. After that, they filtered this database to find out the articles that were full-text, original research related to oncology, had Kenya as the site for research and included at least one Kenyan author. The filtering left them with 284 useful studies. Among those studies, cervical cancer was the most studied cancer (about 35%). It is important to note that it is the second most common cancer. The speaker noted that prostate cancer does not have that many papers, although it is one of the most diagnosed cancer in men in Kenya as well as Africa. The speaker also shared the result of her search on ClinicalTrials.gov for cancer and Kenya as search terms. It was worth noting that breast cancer had only one entry despite being the most common cancer.

She pointed out that a lot of studies done were observational and cross-sectional studies. However, interventional studies were only 4% of the trials. The number of randomized clinical trials is also very limited (2.6%), yet we are doing a lot of epidemiological studies. In terms of host institutions, Kenya National Hospital was top of the list, followed by Moi Teaching and Referral Hospital. The funding mainly came from North America (48%), with one-third from Europe, with very little local contribution. The unpublished data mainly included thesis, dissertations, and KEMRI.

The second publication shared by the speaker is a study on the landscape of oncology clinical trials in Africa. The study is published by Odedina et. al. in JCO Global Oncology in 2020. Referring to the publication, she noted that breast cancer is the commonly studied diagnosis in Africa. She showed a map of Africa colour graded with the number of trials held. A lot more studies were done in the north part of Africa, i.e., Egypt had 45 participating sites. South Africa also had a good contribution, and Kenya lies in almost the middle of the two. It was worth noting that a large part of the continent is not represented by clinical trials. Pointing to the map of Kenya, she noted the regional disparities within Kenya where Nairobi

and the mid-western part was dominated in the clinical trials. The rest of the country is pretty much excluded.

Out of the clinical trial database, she presented the example of a clinical trial run by Aga Khan University Hospital related to oesophageal cancer. She said that it is a testament that we have the capability to do high-level interventional studies if we have the passion.

She concluded her talk with the following observations made:

- We lack a central repository
- There is limited research on cancers affecting men
- Also, there are limited interventional studies
- We are operating in silos

She appreciated the various initiative for bridging these gaps and at least there is some movement to strengthen and make it work. She looks forward to the ways KESHO can leverage these efforts. Dr Miriam thanked her for her insight on identifying the gaps and the need for a central repository.

ESTABLISHING A CANCER CLINICAL RESEARCH PROGRAM IN SUB SAHARAN AFRICA

BY MANSOOR SALEH

Prof Mansoor Saleh is Founding Chair at Department of Haematology – Oncology and Founding Director and Consultant Oncologist of the Aga Khan University (AKU) Cancer Centre. A detailed biography of Prof Mansoor Saleh is included at the end of this report.

He started his talk with the famous statement by Barrack Obama, "Yes, We Can!". As a total framework of like-minded individuals in Kenya, yes, we can. If we get together at a platform like KESHO, we can succeed.

The philosophy of AKU is based upon the 2011 statement of the chancellor when the heart & cancer centre were inaugurated.

> "Let me mention two investment areas that are most sadly short-changed in the developing world. The first is research, and the second is education." – Aga Khan

Our focus has been to do research because that informs education, and it informs better clinical care. There was an article in the Daily Nation two years, that the cancer research from the West won't work on Africans. Although it is true, we need to realize that before we import the drugs developed by the west, our patients need to be represented in the clinical trials. Unfortunately, only 2% of the clinical trials represent Africa, out of which sub-Saharan Africa has only a smaller proportion.

AKU established a clinical research unit in 2020, and the first trial was registered to look at the efficacy of a drug, Tocilizumab, in Covid-19 patients, which ultimately led to its FDA approval. Another study that we replicated, originally performed by Emory University, was a pilot phase Ib/II study of whole-lung low dose

radiation therapy (LDRT) in the treatment of severe Covid 19 pneumonia patients on (or requiring) mechanical ventilatory support.

Prof pointed to the common notion that our gene pool may be different. We take tissues from triple-negative breast cancer, analysed it in Alabama, and compared it with African Americans and Caucasians in Alabama. Surprisingly, we noticed that, yes, our genetic make-up of tumours is much different from those in North America. This is important as we should do research for developing drugs.

Prof Saleh shared the critical ingredients for a successful clinical research program. He emphasized on developed a nimble and supportive infrastructure that facilitates scientific review. The establishment of institutional review boards (IRBs) is important for reviewing grants and contracts. We need trained and committed human resources i.e., CRC / Research RN / DM, Research Pharmacy, Regulatory / Budget. Institutional and national leadership plays a very important role in the support of research.

He concluded his talk by identifying the key metrics. He stressed that we should avoid duplication of effort, avoid sequential processes, and reduce the time to trial activation.

WHAT ARE RESEARCH TIPS FROM THE INTERNATIONAL COMMUNITY, BY PROF WIL NG'WA

Prof Wil Ng'wa is the Director of the Global Health Catalyst at Brigham and Women's Hospital, and Assistant Professor of Radiation Oncology at Harvard Medical School. His full profile is appended at the end of this report.

He started his talk by pointing to the Rising Global Cancer burden and disparities, which is a motivation for us to address it. According to World Health Organization (WHO), there are over 18.1 million cancer cases and over 9.6 million deaths a year. The major Cancer health disparity is that over 60% of cancer incidence and 70% of deaths occur in Low-and-Middle Income Countries (LMIC).

He pointed the audience to an NIH report which identified that the number of research programs in North America (13,157) in 2018 was 30 times higher than the corresponding number across sub-Saharan Africa (434). Combined, South Africa, Kenya, and Uganda accounted for 49% (211) of cancer research programs underway in 2018 in sub-Saharan Africa. For us, there are two major considerations: the benefit this research can provide to Africans, and the benefit this research can provide globally to benefit all.

Prof highlighted that an 'Afrocentric' approach to research has vast need and potential for discovery and translation to address the cancer burden in the region and globally. The research is needed not only for health and economic development. He encouraged the audience to generate a hypothesis or objective by sharing a quotation by Einstein, "Imagination is more important than knowledge".

He encouraged the audience to get involved in multicentre clinical trials such as the ones supported by the NIH-funded Quality Assurance Review Centre, ongoing multicentre clinical trials in hypofractionated radiotherapy and planned multi-centre clinical trials combining radiotherapy and immunotherapy beginning in 2022 supported by foundations. Likewise, he highlighted the importance to get involved in implementation research. One pointer is that hypofractionated radiotherapy can substantially reduce

treatment time and cost, enhance patient convenience, increase access to care (up to 400%) and reduce disparities in the USA and Africa.

Considering the infrastructure availability issues, the speaker motivated the listeners to get involved in research that requires less infrastructure like ICTs and AI. Another area to research is phytomedicine. Professor recalled from his childhood of grass that her mother would ask him to use for wounds. It would be very effective, but he did not know what science behind it was. He gave a couple of examples of phytomedicines that were multibillion-dollar plant projects with discoveries involving collaboration between Harvard and LMIC. One such example is Justicia (blood from plants) which could be used as a substitute for blood in situations like anaemia. Likewise, medical cannabis could be a 7B$ industry for Africa, so research around it won't cost that much.

He shared many funding opportunities with the audience, listed below:

- Seed funding: e.g., Bioventures for Global Health, Professional society grants Global Health Catalyst Visiting Faculty and Co-mentored Research Fellow opportunities:

https://www.globalhealthcatalystsummit.org/apply

- 10 Global Health Catalyst (GHC) visiting Faculty Fellowships and Research Fellowships for 2022 beginning July 1, 2022
- NCI Grants: https://www.cancer.gov/about-nci/organization/cgh/funding
- Cancer Prevention, Detection, Diagnosis, and Treatment Technologies for Global Health
- Strengthening Institutional Capacity to Conduct Global Cancer Research in Low- and Middle-Income Countries (Research training grants)
- International Research Scientist Development Award (IRSDA)
- Innovative Molecular Analysis Technologies for Low-Resource Settings Globally
- Advancing Head and Neck Cancer Early Detection Research (AHEAD)
- Dissemination and Implementation Science for Cancer Prevention and Control in Low Resource Environments
- Dissemination and Implementation Research in Health (R01 Clinical Trial Optional)
- U.S. and Low- and Middle-Income Country (LMIC) HIV-Associated Malignancy Research Centres (U54 Clinical Trials Optional)
- NIH Grants: https://grants.nih.gov/grants/guide/rfa-files/rfa-ca-20-001.html

He concluded his talk by encouraging the audience to submit abstracts to different conferences and summits. One such summit is going to be held in July 2022. The details can be found at www.globalhealthcatalystsummits.org.

PANEL DISCUSSION:

At the end of the talks, there was a panel discussion with all the speakers on board. The moderators thanked all the speakers for the wealth of ideas and sentiments shared by them. She invited the audience to ask questions that panellists would try to address.

The very first question discussed among the panellists was asked by Claris Mafumbo:

"Are there opportunities for research from Undergraduate levels in medicine all the way to Postgraduate levels? Are these research opportunities shared with the students at the different levels of education? Can there be a systemic change in the syllabus to include research education to train the younger scientists in the fields?"

Dr Miriam invited Prof Abinya to address the question. He started by saying that research should start early. Prof recalled his own experience of doing research during his A-levels, which they did with his colleague who was a pharmacist. That simple research that they did in school laboratories was great research that could have led to a Noble prize if they continued it. They took ticks and kept them in different environments to study the effect on their egg production. The ones in the adverse environment had less egg production compared to others. We won a national prize for that.

He reiterated that research could start at that level. If other things don't divert your attention from that, then you find your passion. You can go very in research. The universities have done a lot of research but that has been thrown away. If that is collected and highlighted, it can be applied. He suggested that NACOSTI should find a way to develop an inventory of what happened. Prof said that the ministries are not concerned of what is being done and what is happening. They are doing work on their own without considering what has already been done by universities.

Dr Miriam thanked Prof Abinya for his comments and acknowledged that there is really a great need for the dissemination of research. She then invited Dr Sitna to comment on how the grey literature could be converted into published literature. Dr Sitna started by sharing that one of the challenges that she faced was to convert ideas and proposals into manuscripts. She found herself, and others may also face the same issue, that inking an idea or proposal is easier compared to its conversion into a manuscript.

She said that programs like the one that Prof Saleh is having for CITP, one could develop a manuscript writing workshop for your residents and fellows. This would enable them to convert whatever they are doing in their thesis into a manuscript. In Moi University, there are 2400 articles on cancer, and majority of these are not published. That's mainly because we are not taught how to do that. So, we need to teach ourselves that how to convert our ideas and proposals in manuscripts and get them published. She appreciated the idea of Dr Wilfred submitting our research as abstracts to conferences and publishing locally. KESHO is providing a great platform for that purpose.

Dr Miriam thanked Dr Sitna for making her point on increasing the visibility of the research. She said that most of the comments and questions asked here actually revolve around building research training capacity. She, then, invited Dr Hammad to comment on the best practices that we can employ in research training for our workforce and how can we inculcate in the skills that can translate into publishing. Dr Hammad started by referring to Prof Abinya's input that we should start early. She added that we should have longitudinal training instead of having a one-spot session. Like, we can have some summer schools or research fellowships. She also stressed the importance of having PhDs, as they have four years of training in research.

She highlighted the importance of local publishing and said that we cannot expect our trainees to do research and publish if we leave for them very limited space for publishing. Prof Abinya made a very

good comment that as researchers we sometimes look for big capitals for ourselves. If we do something for others, maybe everyone including ourselves could benefit from that. We should design some simplest research projects to alleviate poverty, as pointed out by Dr. Peter.

In the closing remarks, the speakers concluded that research is a continuous process, is not a one-off event and it should continue. Such events such as this, are a source of motivation and inspiration for the participants. Having role models is critically important. Dr Oyiro recalled a statement from one of his mentors, "If you can't inspire, then be ready to expire". Towards the end of the panel discussion, Dr Miriam handed the concluding session over to Dr Zipporah Ali, the Executive Director of Kenya Hospices and Palliative Care Association (KEHPCA) (her full biography can be found in the end of this report).

Dr Zipporah Ali thanked the speakers and participants for sparing their precious time, despite the time zone difference making it odd hours for some of them. She highlighted the importance of research in oncology by sharing her conversation with the Kenya Health Cabinet Secretary the day before the symposium that "although we have two hands, one head, and two legs like the people in the west, there is a lot more difference'. She aspired to increase the contribution of oncology research from Africa to global research which is currently less than 4%. We need to have proper research and appropriate evidence to improve our practice. All that needs more effort and dedication. She said that it is not just the funding that is an issue but people serving in busy clinics usually have no time for research. We need a lot more than just funding, like capacity building, to have more research contributions.

The senior researcher recalled her own days of doing a 3-month internship in Prof Abinya's ward. She remembered that she had to work hard due to very high standards set by the Professor. Although it was a miserable situation to be at that time, that paid off well as she did her best on it. She appreciated the KESHO Secretariat for organizing such a wonderful and successful event. She thanked the moderator, Dr Miriam Mutebi, for moderation of the symposium and her leadership at KESHO and AORTIC. She also appreciated the efforts of the people behind the stage, Ms Natasha, and her team, for sparing their Saturday to bring people together. Finally, she thanked participants for putting life into the event, as the live participant count touched 240 at one point.

She said that she looks forward to more events like this from the KESHO platform. She ended the session by saying *'Asante Sana'*, which is a Swahili way to say, 'thank you very much'. Dr Mariam thanked Dr Zipporah for her comments and closed the event by echoing Dr Oyiro's statement - *let's be ready to inspire before we expire.*

SPEAKER PROFILES:

PROF NICHOLAS ANTHONY OTHIENO-ABINYA

Nicholas Anthony Othieno-Abinya is a Consultant Medical Oncologist at the Nairobi Hospital Cancer Centre. He was formerly Professor of Medicine at the University of Nairobi, Kenya, where he was the Director of Medical Oncology Fellowship Program and the Head of Haematology/Oncology at the University of Nairobi and Kenyatta National Hospital, Nairobi. In 2009 and 2010 he was Head of Oncology at AgaKhan University Hospital, Nairobi.

He holds a Master's Degree in Internal Medicine of the University of Nairobi, completed fellowship in Medical Oncology at the Royal London Hospital (University of London) in 1992, and is a Fellow of the Royal College of Physicians of Edinburgh.

His research interests are in malignant haematology and breast cancer, in which he has published widely in peer-reviewed journals. He also has keen interest in molecular oncology. He has authored a textbook titled Drug Treatment of Haematologic Neoplasms. He has also co- authored cancer booklets, and has written chapters in several books. His latest book titled 'Shadow in Perpetuity' by Lambert Publishers was released in December 2019.

Dr. Othieno-Abinya is a member of American Society of Clinical Oncology (ASCO) and served in its International Affairs Committee from 2010-2012; Africa Organization for Research and Training in Cancer (AORTIC), having been Vice Chair for Eastern Africa and was a long-time member of Council; and European Society for Medical Oncology (ESMO). He founded Kenya Society of Haematology and Oncology (KESHO), of which he was the first Chair, and is still its Patron. His outstanding academic achievements were profiled in the University of Nairobi magazine,' Varsity Focus' of September 2017.

He has received several awards and honours, including Kenya Breast Health Programme Award in appreciation of contribution to success of the Breast Cancer Survivors' Conference on 11-14 July 2003; Kenya Breast Health Programme Award in recognition for outstanding contribution to the care of women with breast cancer in Kenya; Best Oral Presentation by Established Scientist Award, 2ND KASH Conference, Kenya Medical Research Institute, Nairobi; 2018 Harvard Global Health Catalyst: Distinguished African Ambassador Award.

PROF NAZIK HAMMAD

Nazik Hammad is an Associate Professor at the Division of Medical Oncology, Queen's University, Kingston Health Science Centre, Ontario, Canada. She is the Chair of the Education and Training Committee of the African Organization in Research and Training in Cancer (AORTIC). Dr. Hammad is a visiting professor at the University of Nairobi, Kenya. She is the co- chair of the Network for Advancing Black Learners (Medical Students and Residents) in Ontario. She is the former Director of Global Health, Faculty of Health Sciences at Queen's University. She is an executive member of the Global Oncology Program at Queen's University. She treats GI, breast and brain tumours.

Dr. Hammad has a keen interest in medical education, in particular health professions education in low and –middle-income countries (LMICs) and cancer workforce development. She has a Master's degree in Medical Education in the Health Professions (MEHP) from Johns Hopkins University. She teaches regularly at the Clinical Oncology Training Program in Khartoum, Sudan and as a visiting professor at the Medical Oncology Fellowship Training Program, University of Nairobi, Kenya. Her areas of expertise include training program development and evaluation, accreditation, curriculum development, mentoring and innovations in education. Her work on education has been presented at international conferences and published in peer-reviewed journals. She is a recipient of several grants in education including the Royal College of Physicians and Surgeons of Canada International Development, Aid and Collaboration Grant in 2020 for Faculty Development among African Oncologists.

Her other areas of interest include value in cancer care. Together with colleagues in African she led the first Choosing Wisely Africa that was recently published in the Journal of Global Oncology.

DR PETER OMONDI OYIRO

Peter Oyiro is currently a Lecturer at the Department of Clinical Medicine and Therapeutics, at the University of Nairobi. He also a Consultant Physician and Medical Oncologist at the Kenyatta National Hospital Teaching and Referral Hospital, Nairobi.

Dr Oyiro attended his Research Fellowship in Haematological Malignancies at the West Virginia University Cancer Centre (2013) and Medical Oncology fellowship at the University of Nairobi (2018).

He is a member of Kenya Society of Haematologist and Oncologist (KESHO), American Society of Clinical Oncologist (ASCO) and the European Society of Medical Oncologists (ESMO). Dr. Oyiro main interest is in Research and cancer education particularly in Haematological Malignancies, HIV associated neoplasms and Sickle cell disease as well as newer cancer targeted therapy and immunotherapy.

PROF MANSOOR SALEH

Mansoor Saleh, MD received his early education in the Aga Khan School system in East Africa, his medical education at the University of Heidelberg in Germany and conducted his doctoral research at the Max Planck Institute for Medical Research in Heidelberg. He received his training in internal medicine at the Henry Ford Hospital in Detroit Michigan and clinical and translational research training in Haematology & Oncology at the University of Alabama Comprehensive Cancer Centre in Birmingham, Alabama where he was tenured Professor of Medicine & Pathology and Director of the First-in-Human Early Drug Development Program.

His area of research and clinical focus is “targeted therapy of cancer”. In January 2020, he joined the Aga Khan University in Nairobi, Kenya as the Founding Chair, Department of Haematology – Oncology and Founding Director - AKU, N Cancer Centre.

DR SITNA ALI MWANZI

Sitna Ali Mwanzi is a Consultant Medical Oncologist working at the Aga Khan University Hospital, Nairobi. She is the former Chair of the Kenya Society of Haematology and Oncology (KESHO) which is a professional organization whose aim is to reduce the cancer burden and mortality in Kenya through education, research and advocacy initiatives.

Dr Mwanzi attained her Bachelor of Medicine and Surgery from the University of Nairobi and Master of Medicine in Internal Medicine from the Aga Khan University Hospital, Nairobi. She undertook a fellowship in Medical Oncology at Barts Health NHS Trust in the United Kingdom attaining a Specialist Certificate in Medical Oncology from the Royal College of Physicians and Association of Cancer Physicians in the United Kingdom. She also has a Master of Science in Advanced Oncology from Ulm University in Germany. She has recently been recognized as a Fellow of the Royal College of Physicians, Edinburgh (FRCP).

Her research interests include breast cancer, prostate cancer, chronic myeloid leukaemia and cervical cancer. She is passionate about increasing health care worker and general public awareness about cancer, role of screening, early diagnosis and treatment of cancer.

Dr. Mwanzi works closely with the National Cancer Control Program in implementation of the National Cancer Control Strategy. She has also been involved in the development of national guidelines for Kenya and harmonization of the National Comprehensive Cancer Network (NCCN) guidelines for Sub-Saharan Africa.

PROF WILFRED NG'WA

Wilfred Ngwa is the Director of the Global Health Catalyst at Brigham and Women's Hospital, and Assistant Professor of Radiation Oncology at Harvard Medical School. Dr Ng'wa earned a Bachelor's degree at the University of Buea Cameroon, graduate degrees at the University of Leipzig Germany, and subsequently postdoctoral and clinical training at Harvard Medical School. He currently leads a Global Health Program with research developing new technologies and approaches to boost cancer cure rates and reduce global health disparities.

This work has been recognized with a number of awards, including the prestigious BWH BRIght Future's Prize in 2015 (for the project "Tiny Drones to Target Cancer"). Other awards include two "Best in Physics" Awards by the American Association of Physicists in Medicine (AAPM) and Canadian Organization of Medical Physicists, Research Excellence Awards from the National Cancer Institute, and innovation awards from Partners Healthcare, among other awards.

Dr Ngwa's research is focused on the clinical translation of technologies/approaches that can increase access to quality cancer treatment. This includes smart radiotherapy biomaterials (Tiny drones to Target cancer or nanoparticle drones) and Phytomedicines. The award-winning drone technologies are designed to help eliminate both local and metastatic tumours with minimal collateral damage or side effects. The drones can be employed to sustainably deliver different drug payloads (including immunotherapy/chemotherapy drugs or cannabinoids) precisely to disease sites or targets, with greater therapeutic efficacy. This work leverages the abscopal effect and the biomaterials drone technology in research to significantly increase survival and quality of life for patients.

DR MIRIAM MUTEBI (MODERATOR)

Miriam Mutebi is a Consultant Breast Surgical Oncologist and Assistant Professor in the Department of Surgery at the Aga Khan University Hospital in Nairobi, Kenya. She is also a clinical epidemiologist and health systems researcher with a research focus on understanding barriers to access for women with cancers in Sub-Saharan Africa and in designing interventions to mitigate those barriers.

Dr Mutebi is the President Elect of the African Organization for Research and Training in Cancer (AORTIC), the Chairperson for the Kenya Society of Haematology and Oncology (KESHO) and on the board of directors of the Union for International Cancer Control (UICC). She is also the co-founder of the Pan African Women's Association of Surgeons (PAWAS- www.africanwomensurgeons.org) which was developed to mentor and provide transformative leadership for women in surgery in order to improve surgical care and pathology on the continent and is part of the Kenya Association of Women Surgeons.

She is the Co-chair of the National Cancer Taskforce in Kenya, Chair of the Commonwealth Taskforce for the elimination of Cervical Cancer and a commissioner with three Lancet commissions of Women and cancer, Cancer in sub-Saharan Africa and Breast Cancer. She is currently pursuing a pilot's licence in order to extend breast care services to marginalised areas.

Dr. Zipporah Ali, MD, MPH, MPC, HonDUniv
Chair of Non-Communicable Diseases Alliance Kenya
Technical Advisor/Consultant/Researcher

Dr Zipporah Ali has recently retired from the position of Executive Director of Kenya Hospices and Palliative Care Association (KEHPCA), a position she held for 15 years. She serves on the board of several organizations including Kenya Hospices and Palliative Care Association, International Children's Palliative Care Network (ICPCN), City Cancer Challenge, Alzheimer/Dementia Kenya, Public Health and Palliative Care International and Kenya Network of Cancer Organizations (KENCO). She has previously served on several other global, regional, and national boards.

Dr. Ali has been and continues to be involved in advocacy and creating awareness on pain relief and palliative care in Kenya for children and adults as well as Universal Health Coverage. In her leadership role as the Executive Director for KEHPCA, she was very instrumental in fostering strong relationships with the Ministry of Health to integrate palliative care into government hospitals. She was also instrumental in advocating for palliative care to be included in the undergraduate medical and nursing schools in Kenya. She is a strong advocate for cancer prevention, control and treatment and was instrumental in developing the first National Cancer Control Strategy and the National Guidelines for Cancer Management-Kenya. She has also advocated for palliative care to be integrated in other non-communicable diseases as well as infectious diseases.

Dr. Ali has been involved in a number of activities at the World Health Assembly (Geneva) and the UN High Level Meetings on Non-communicable diseases. She is a strong advocate for right to health for all and a supporter of the movement on meaningful involvement of persons living with serious health conditions and leaving no one behind.

Dr. Ali holds an MD from Ege University, Izmir, Turkey, a Master's Degree in Public Health from the University of Nairobi, a Higher Diploma in Palliative Care from Oxford Brookes University, and a Masters in Palliative Care from the University of Dundee. She has completed the International Pain Policy Fellow program with the International Pain Policy Studies Group (WHO Collaborating Centre for Policy and Communication in Cancer Care, University of Wisconsin) as well as Higher Diploma in the International Palliative Care Leadership Development Initiative at The Institute of Palliative Medicine at the San Diego Hospice.

She has received several awards in recognition of her work nationally and globally. These include:

- Doctor of Law Honoris Causa-University of Dundee (2018)
- International Humanitarian Award-Women4Africa (2018)

- Social Impact Award for the Sub-Saharan Africa region-British Council (2018)
- Honorary Doctor of the University by Oxford Brookes University (2012)
- Individual Advocacy Award by the African Palliative Care Association and Open Society Foundations (2013
- African Palliative Care Award – (In recognition for being on the interim board and later serving on the board for 2 teams) -2007

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