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AKU Research

July 2018 | Issue 9





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AKU Research, formerly known as Research Outlook, is published annually by the Office of Research and Graduate Studies to highlight research, scholarship, and innovative activity across all disciplines at the Aga Khan University. Opinions expressed do not necessarily represent the views of the University.

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Messages

The Aga Khan University from its inception has aspired to be a research-led institution to build local capacity to address the needs of the developing world. We are of the belief that the solutions to the problems of the countries in the developing world come from within the country and not from the outside.

At AKU, our aim is to encourage faculty, students and staff to engage in raising questions to be researched to create better solutions to the increasingly complex issues of the real-world. This will equip AKU to make an impact through discoveries in diverse fields and dissemination of new knowledge. This is how AKU makes a positive change across diverse fields.

The AKU Research magazine is not just an attempt to highlight and celebrate the remarkable achievements of our researchers who engage in carrying out the cutting-edge research but also a way to reach out and connect with policy makers and the public at large to help build an overall conducive environment for research activities and to disseminate vital information about research at AKU.

Firoz Rasul

President and Chief Executive Officer

The Aga Khan University with its campuses in six countries is part of the larger Aga Khan Development Network with access to knowledge, field experience and resources in several disciplines. It offers exciting opportunities to engage in comparative and cross-cultural research of significance and relevance to the largely low-income-countries that it serves.

However, research does not flourish in a vacuum. It requires a creative, supportive and enabling environment. As Provost, it is my mission to support high quality research and innovation alongside other scholarly activities through a dynamic, nimble, responsive and increasingly proactive research support infrastructure at AKU.

Whether it is access to state of the art laboratories and equipment or field facilities to conduct large-scale studies in health sciences, or small seed money grants to help early career researchers in education taking first steps on their academic journey, research support at AKU cuts across traditional boundaries and hierarchies of disciplines. It is also my objective to enhance the research endowment to provide more seed funding for new researchers and new projects.

The AKU Research magazine provides a glimpse of some of the initiatives already taken in this direction such as, a restructured ethics review system, creation of an institutional bio-safety committee, efficiency in grant management system or enabling dedicated spaces for innovation.

I look forward to your engagement and support in bringing about a qualitative change in the research environment at AKU.

Professor Carl Amrhein

Provost

In today's increasingly technological and global world with changing demographics, new questions are emerging for communities and societies that require innovative and creative solutions. Old paradigm of universities as ivory towers of knowledge production is making way for universities as significant stakeholders in the social world with a role to play in societal development.

In this context, AKU is on an exciting journey of expansion and transition in research from a largely health sciences focused university towards a liberal arts university with emerging strength in research in the social sciences, humanities and arts. Faculty, students and research staff engage in cutting edge innovative research in health sciences, education, human development, media and communication, and Muslim civilisations. Whether it is a new method of diagnosing tuberculosis or investigating how ideas and memory were recorded and shared in pre-modern Islamic world, research at AKU is relevant to the peoples and their problems within the context in which they are situated.

The AKU Research magazine celebrates the achievements in research across AKU campuses in six countries. It provides qualitative insights into impact of research on individuals, community and society at large. The magazine also informs the AKU community about the significant changes being introduced to make the research environment increasingly creative and facilitative.

We hope you will enjoy reading this issue as much as we enjoyed producing it.

Professor Anjum Halai

Associate Vice Provost (Social Sciences, Arts & Humanities)

Professor Fauziah Rabbani

Associate Vice Provost (Health Sciences)



Firoz Rasul



Professor Carl Amrhein



Professor Anjum Halai



Professor Fauziah Rabbani

A new way to diagnose childhood TB

The collaboration between researchers from private and public-sector hospitals has led to the introduction of an easy-to-use method to diagnose children suspected of having pulmonary TB.

Pakistan ranks sixth globally amongst 22 high-burden countries for tuberculosis (TB), mostly based on data from adults as childhood TB remains underdiagnosed, misdiagnosed and often just not considered at all.

TB is caused by inhalation of droplets containing *Mycobacterium tuberculosis* (MTB). The organism first infects lung tissue and given a chance, it spreads through blood to other sites to cause extrapulmonary TB. The proto-typical snapshot remains the X-ray image of an infected lung and the gold standard remains culture of the bacteria.

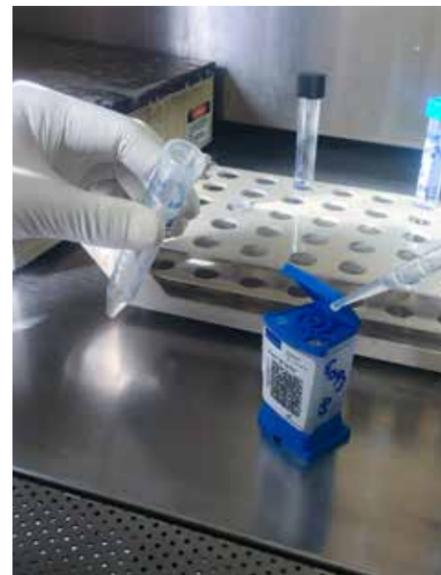
Diagnosis of pulmonary TB relies mainly on sputum-based tests but young children tend to swallow their sputum rather than bringing

it up. In the absence of sputum tests, diagnosis of pulmonary TB in such children is primarily based on clinical features. Laboratory diagnosis, if required, is performed on gastric aspirates, which is invasive and may require hospitalisation.

A major advance in TB diagnosis has been the introduction of an automated cartridge-based detection system; Gene Xpert MTB/RIF which is highly sensitive and can detect traces of MTB within two hours.

The test was initially recommended for the diagnosis of adult respiratory TB, but subsequently approved for other specimens and now, found to be successful in diagnosis of MTB in the stool of children with pulmonary TB. Researchers from the Aga Khan University in collaboration

with pediatricians at Civil Hospital, Karachi, conducted an operational research project to introduce the utility of stool-based testing using Xpert MTB/RIF assay in children suspected



The Xpert MTB/RIF cartridge is being loaded inside biosafety level 3 hood.



Dr Zahra Hasan (L), Dr Rumina Hasan (M) and Dr Sadia Shakoor (R) stand in front of the Gene Xpert machine.

of pulmonary TB. At AKU, the lead investigators were Dr Zahra Hasan, Dr Sadia Shakoor and Dr Rumina Hasan whereas at the Civil Hospital, Dr Aisha Mehnaz, Dr Fehmina Arif and their teams were involved.

The study showed that stool-based testing using Xpert MTB/RIF had comparable specificity and sensitivity to the gold standard of culture which takes six to eight weeks. As stool collection is relatively simple, non-invasive, does not require special conditions and can be performed at home by family members of the affected child and then submitted to the hospital.

This reduces inconvenience and expense of hospital admission such as required for gastric lavage. Studies conducted earlier had evaluated

**Gene Xpert
MTB/RIF is highly
sensitive and can
detect traces of MTB
within two hours**

stool-based testing in children with HIV with disseminated TB, due to their lower host protective status. However, this study tested children with a competent immune system. We first screened children as per a TB risk score used by the Pakistan Pediatrics Association. Testing of children identified at risk for pulmonary TB showed stool-based Xpert MTB testing to be as

effective as gastric lavage Xpert and MTB culture (the gold standard). Subsequently, stool-based testing has been introduced into routine practice at the AKU Clinical Laboratory. This operational research project was a small grant scheme project funded by the WHO's Regional Office for the Eastern Mediterranean and the Special Programme for Research and Training in Tropical Diseases (EMRO/TDR). This collaboration between researchers from private and public-sector hospitals has led to introduction of an easy-to-use method for diagnosis of children suspected of pulmonary TB. The scope of this work can be expanded to have a significant impact on the diagnosis of TB in children.

Dr Zahra Hasan, Professor and Section Head, Pathology and Laboratory Medicine

Strengthening health systems in underserved areas

Access to Quality Care through Extending and Strengthening health Systems aims to significantly reduce maternal, newborn and child mortality



The AQCESS is a multi-country project implemented in Kenya, Mali, Mozambique and Pakistan which aims to significantly reduce maternal, newborn and child mortality in underserved areas. The four-year project (2016-2020)

is funded by Global Affairs Canada (GAC) and the Aga Khan Foundation Canada (AKFC) and implemented by Aga Khan Development Network (AKDN) agencies in collaboration with the public sector in developing countries.

AQCESS pursues a health system strengthening approach through evidence-based interventions designed to improve the availability, quality and utilisation of essential reproductive, maternal, newborn and child health (RMNCH) services.

AQCESS

is a 4-year project (2016-2020)

Key milestones achieved in first two years:



AQCESS works with the ministries of health, local government and other partners to reach areas that are remote, underserved and have poor health indicators.

The project focuses on, enhancing capacities of the public health system to provide quality of care through improving the infrastructure of selected health facilities; training and mentoring of health personnel; and improvement of the functionality of the local health management and the management information systems.

A major project component, which is based on national community health strategies, is to enhance health promotion and outreach activities that will improve community uptake of reproductive, maternal, newborn, child health services.

The monitoring, evaluation, research and learning (MERL) component is led by the AKU, Centre of Excellence in Women and Child Health under the AKU Faculty of Health Sciences, Nairobi.

The MERL Unit for AQCESS works closely with SickKids Canada and is specifically strategised and designed to provide operational support for monitoring and evaluation of programmatic activities of the project. This is done across the four AQCESS projects based on international standards and to maximise opportunities for research and learning that benefits from both routine and specific data collection.

The following are some AQCESS achievements in the first two project years:

Baseline Assessment of MNCH Indicators: The MERL Unit conducted baseline studies that provided an in-depth analysis of the status of key RMNCH indicators in the four AQCESS project countries. The baseline data are a useful resource to inform the project teams, their government counterparts and other key actors on the specific local RMNCH situation in the project areas and to also provide evidence for both further project planning and implementation as well as focused RMNCH interventions in the project areas.

Specific Project Achievements in Kenya

Community Surveillance and Health Information System: The AKU MERL Unit set up a platform for community health surveillance on key health



indicators at household-level in Kilifi County, Kenya. Key achievements during the period have been the expansion of community coverage of this very useful knowledge platform.

Before the project, there were four community units participating in the AKU surveillance, there are now 10 community units.

Strengthened data collection capacity of community health volunteers: During the first two project years, the surveillance platform had trained 312 community health volunteers for effective household-level data collection, data interpretation and use for community-level planning.

The surveillance system has also established an electronic data collection platform, which has led to enhancement of data quality and enabled more efficient data management process in collaboration

with the local Ministry of Health. Use of data to improve health system delivery: The surveillance system has been generating population-level data which is shared with the county and sub-county health system managers (CHMTs & SCHMTs) on a regular basis and informs discourse on how to improve health outcomes at these levels.

AQCESS
pursues a health system strengthening approach through evidence-based interventions designed to improve the availability, quality and utilisation of essential reproductive, maternal, newborn and child health services

Improved data quality management in health facilities: The project has so far conducted two rounds of data quality audits in the 10 project

facilities which participate in the project. The two rounds have so far led to robust discussions among the health facility managers, health records officers and other health personnel on how to improve on timeliness and accuracy of data.

Research: In consultation with county health authorities and respective sub county SCMOHs, the project has initiated research that will generate scientific evidence on clinical mentorship of nurses and midwives to improve quality of services during the time of delivery in the two project counties in Kenya on a sustainable basis. Apart from generating scientific evidence on the value addition from the effective mentorship programme, the study will also strengthen the capacity of nurses who participate.

Dr Marleen Temmerman
Professor and Director, Centre of Excellence in Women and Child Health, East Africa

PCV-10 vaccine protects children from disease

The Pneumococcal Conjugate Vaccine was found to be 70 per cent effective in protecting children from 10 strains of pneumonia and meningitis

Pneumonia and meningitis account for nearly one in three child deaths in Pakistan every year. A four-year study of the impact of the Pneumococcal Conjugate Vaccine (PCV-10), has found that the vaccine prevents children from contracting deadly strains of the two diseases.

The study, funded by the Global Alliance for Vaccines and Immunisation (GAVI) and conducted by researchers from the Aga Khan University, investigated the impact of PCV-10 in Karachi, Hyderabad, Matiari and Thatta.

Researchers found that the vaccine was 70 per cent effective in protecting children from 10 strains of pneumonia and meningitis. In addition to studying the vaccine's effectiveness, researchers also analysed factors affecting the coverage of the vaccine

in Thatta and Tando Muhammad Khan, two rural districts of Sindh - the province with one of the lowest rates of immunisation coverage. The implementation of these recommendations by local authorities more than doubled vaccine coverage in the area.

"In Pakistan, pneumonia is the leading cause of death in children over the age of one month. Our study clearly demonstrates the value of making this vaccine available to every child and puts forward new recommendations that will extend the reach of the vaccine to every child, in rural and urban parts of the country," Dr Asad Ali, associate dean of research at AKU, says.

Pakistan is the first country in South Asia to introduce the PCV-10 vaccine against pneumonia and meningitis into



its door-to-door routine immunisation programme. The vaccine's rollout across the country in late 2014 was enabled by a wide-ranging network of partners known as the Sindh Pneumococcal Vaccine Study Group.

Partners included federal and provincial governments, GAVI, and participating tertiary care hospitals and universities across Sindh that analysed evidence and developed approaches to assess the vaccine's effectiveness. The nationwide rollout of PCV-10 meant that a course that cost individuals up to Rs16,000 is now available to all Pakistanis at no cost.

Dr Asad Ali, Associate Dean, Research, and Associate Professor, Paediatrics and Child Health

Dr Shehla Zaidi, Associate Professor, Paediatrics and Child Health



Drivers of intimate partner violence: Insights from Pakistan

A ground-breaking study explores the drivers of intimate partner violence in the fragile and post-conflict contexts of Pakistan, Bangladesh, and Nepal

Intimate partner violence (IPV), is an area where the evidence discrepancies are significant.

A ground-breaking study was carried out to explore the drivers of IPV in the fragile and post-conflict contexts of Pakistan, Bangladesh, and Nepal with a special focus on young men and/or adolescents given that this is a period in life in which gender identities and patterns of behaviour are often intensified and consolidated.

It explored multi-level drivers of male perpetration of IPV in Pakistan, alongside the importance of conservative gender norms. It also investigated how broader political-

economy dynamics shape attitudes, behaviours and the provision of support services related to the IPV.

The study further determined the types of policies and programmes that exist to tackle male perpetration in IPV, and the associated implications for policy and practice to strengthen responses to the IPV. To ensure deep insights and understanding of the issues, a qualitative approach was used for the study.

In-depth interviews were a major tool for interaction with boys and men and also with survivors of violence. Focus group discussions

were conducted with adult women, men, adolescent girls and married men to explore the broad gender norms that underpin practices and sanctions around the IPV. Intergenerational trio interviews were conducted with three family members of different generations.

The study revealed significant findings and identified drivers of intimate partner violence at multiple levels. At the individual level, lack of education, poverty, unemployment, drug and alcohol abuse along with witnessing violence in childhood were identified as drivers of the male perpetration of the IPV. At the household level, conflict in

family relationships, mostly fuelled by in-laws, gave rise to violence from male partners. Polygamy was also found to be a driver of violence against women.

Major driving factors of IPV at the community level were traditional social norms. Social norms around femininity restrict women's freedom and movement and reinforce the traditions of arranged and early marriages. Social norms are also used to justify violence against women, mainly by men who cite religious teachings and expectations. Traditional and social media while helpful in providing information on existing services also emerged as

contributors to a context where violence against women is both justified and expected. To address the issue of IPV; engaging men, strengthening institutions and implementing policies came up as strong recommendations.

Dr Anita Anis Allana, *Senior Coordinator and Senior Instructor, Curriculum Development and Working Group for Women*

Dr Nargis Asad, *Associate Professor, Psychiatry*

Dr Rozina Karmaliani, *Professor, School of Nursing and Midwifery and Community Health Sciences*

Levels of Intimate Partner Violence

Individual

- Lack of education
- Poverty
- Unemployment
- Drug and alcohol abuse
- Witnessing violence in childhood

Household

- Conflict in family relationships
- Polygamy

Community

- Traditional social norms

Pakistan's first population-based biobank launched

The AMANHI biorepository's main objective is to identify epigenetic and biological markers which could predict (pre-) eclampsia, preterm births, intrauterine growth restriction, stillbirths and poor growth and development

Genome wide association studies of disease and health have picked up momentum globally, yet translation of genetic effects into clinical practice has been lagging behind. One of the reasons is that the major burden of disease is held by the developing world with an insufficient amount of research work being undertaken.

In this milieu, the Alliance for Maternal Newborn Health Initiative/Improvement (AMANHI), a multicentre collaboration between Pakistan, Bangladesh and Tanzania under the leadership of WHO, embarked upon establishing the first in-country, population-level biorepository in low income settings.

The AMANHI study was initiated with the aim of collecting high-quality, representative, cause-specific

data on maternal and neonatal mortality, and stillbirths, from a well-characterised cohort of pregnant women. Importantly, this study has identified that hypertensive disorders and infections during pregnancy lead to substantial burden of stillbirths and hypertensive disease and obstetric haemorrhage account for the majority of maternal deaths.

Within this cohort, the biorepository was started under the supervision of Dr Fyezah Jehan and Dr Imran

The biobank operates as a biorepository resource to preserve valuable biological samples at -80°C

Nisar from the department of paediatrics and child health.

The main objective of this biorepository is to identify epigenetic and biological markers which could predict (pre-) eclampsia, preterm births, intra uterine growth restriction, stillbirths and poor growth and development.

Early identification of diseases would allow for anticipatory management and prevention of these adverse birth outcomes and improved early childhood growth and neurodevelopment.

The biobank is located at the Aga Khan University, Karachi, Pakistan. The AMANHI biobank operates as a biorepository resource to preserve valuable biological samples at -80°C

with round-the-clock biomedical services support. It currently holds over 16,000 aliquots of biological samples including maternal and neonatal blood, urine, stool, paternal and neonatal saliva, placenta and umbilical cord blood. Simultaneously, there is rich phenotypic data that is collected to comprehensively assess most known risk factors of adverse maternal and neonatal outcomes as well as childhood growth and neurodevelopment.

To ensure success of the biorepository, it is imperative to maximise the utilisation of its biological samples to answer relevant questions of strategic interest to our population. With this intent, the biorepository is open to collaborations with national and international organisations. On-going collaborations include

those with Edinburgh University in Scotland and with Stanford University, Cincinnati Children's Hospital and Iowa University in the United States. These collaborations will play a major role in identifying simple biomarkers for assessment of gestational age and preterm birth – a major challenge in the Pakistani population.

In addition to collection and storage, the biobank also facilitates sample retrieval including DNA extraction, transport and shipping.

Bio banking as a science has evolved tremendously. Biorepositories have become unified, scientific resources necessary to answer wide range of questions for the benefit of human health, instead of individual collections of biological samples for specific studies. The data

associated with stored biospecimens has increased in intricacy from basic information to extensive information comprising many aspects of participant phenotype extending into genetic, proteomic, and other “-omics” information.

While setting up of a functioning biorepository is a crucial first step, inequities need to be further reduced with shifts in research investment priorities from high-income to low and middle-income countries by enabling them to invest in high-throughput technologies for analysis of these “-omics” traits.

Ambreen Nizar, *Research Specialist, Paediatrics and Child Health*

Muhammad Ilyas, *Manager, Paediatrics and Child Health*



Science education for the future: A policy brief for Pakistan

AKU faculty urges government to adopt five policy recommendations to promote science literacy across the nation

High quality education particularly in the area of science, technology, engineering and mathematics (STEM) is a strong indicator of quality of life, sustainable human development and eradication of poverty.

The world's most prosperous societies are distinguished by their ability to generate knowledge that helps them tackle the challenges posed by poverty, hunger, pollution and inequality. This ability to generate knowledge by asking questions and approaching problems in new, imaginative ways relies on a scientific mindset being inculcated at the primary, secondary and higher education levels.

However, the persistence of outdated teaching methods in science in

Pakistan's classrooms, coupled with a lack of emphasis on developing qualified science teachers, is holding back the country's potential to excel in science and technology; according to the IED's Professor Nelofer Halai who has urged the government to adopt five policy recommendations that will promote science literacy across the nation.



In support for her policy recommendations, Professor Halai contends the following:

In Pakistan, rote-memorisation is the most common method of teaching. Science teaching needs to develop conceptual learning and help pupils to understand science as a way of knowing. Pupils from kindergarten onwards must learn how science knowledge is generated. That is why inquiry has acquired an iconic status in the current scenario of science education. In inquiry pupils are encouraged to raise questions and develop a process to find answers to the questions. This process allows pupils to collect data, analyse it, and draw defensible conclusions. Teachers themselves lack conceptual understanding of science content

Professor Nelofer Halai's policy recommendations:



1.  Every child has a right to quality science education in school.
2.  Every child has a right to be taught by qualified science teachers from primary to secondary to higher education.
3.  B.Ed. & other teacher development programmes for teachers must demonstrate the use of inquiry and other active methods of teaching science.
4.  B.Ed. & other teacher development programmes for science teachers should include a strong mentoring component.
5.  A systematic process for induction of science teacher educators in colleges of education should be developed on a priority basis.

as well as an understanding of the nature of science and hence cannot help their pupils to do so. This cycle has to be broken. Science teachers need to be mentored into using more active methods of teaching.

Generally workshops are seen as a method to develop teachers' professional knowledge. Workshops are effective in developing awareness of new ways of teaching, but are rarely able to help teachers to implement new methods of teaching without direct and continuous support from mentors who offer support in and outside the classroom.

Science teachers in remote areas of rural Sindh taught primary science using active methods of teaching because mentors (developed from

among them) supported their teaching for 2-3 years. MSTARs, a study conducted in rural Sindh, illustrated the success of some of the mentors and demonstrated the power of sustained support and mentorship in improving teaching. Mentors are teachers who have good pedagogical knowledge together with mentoring skills such as ability to observe a lesson and give constructive feedback. Hence, to develop the effective science teachers a cadre of mentors is needed. This need not entail a whole new structure; experienced teachers in the school could act as mentors for prospective teachers during the teaching practicum. At this point this important part of the B.Ed. programme is not optimally utilised and the B.Ed. degree is itself

fast losing relevance due to lack of trained teacher educators. A cross provincial study in Sindh and Punjab carried out on teacher educators in the B.Ed. programme where 64 classroom observations showed that they practice as content providers and not as skill or practice providers.

This means that in a science class almost all of the time was spent in teaching science content and almost no time was spent on how to teach it. Nor was there a space in their programme to practice teaching science in a real classroom. Science education for the future requires better science teacher educators which could lead to better science teachers.

Dr Nelofer Halai, Professor, Institute for Educational Development

Girls' Right to Education Programme improves school culture in GB

The overall goal of GREP is to contribute to the cause of girls' education in the marginalised communities of Gilgit-Baltistan

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) Pakistan has extended its Girls' Right to Education Programme (GREP) to Gilgit-Baltistan (GB).

The Professional Development Centre, North (PDCN), an extended arm of the Aga Khan University's Institute for Educational Development, Pakistan, is implementing the project in at least 34 public sector schools in Gilgit, Hunza Nager districts of GB.

The overall goal of GREP is to contribute to the cause of girls' education in the marginalised communities of GB through (i) community mobilisation and social advocacy and (ii) improvements in school physical and learning conditions. Currently, GREP is in

its second year of the operation and activities are being carried out around these two overarching goals. Concurrently, several initiatives are in process to enhance learning conditions by improving the knowledge and skills of the teachers and by making schools attractive places for students by improving the physical settings.

As a result of these initiatives, the local communities are playing vital roles in various school activities including arranging events and celebrations, inviting and connecting religious and political leaders to schools, negotiating with government authorities for arranging resources for the schools and mobilising the local communities to contribute to the cause of schools both in terms of

finance and time. Parents have come together to provide missing facilities to their schools and mother support groups are playing a vibrant role in establishing communication flow between schools, parents and the broader community.

The GREP intervention has changed school culture by helping teachers to make their approach to teaching participatory and joyful for children.

Students and their parents as well as the wider village communities are actively participating in these events, which is significantly improving home-school relationships.

Dr Mola Dad Shafa, Associate Professor and Head, Professional Development Centre, North

Tackling pre-eclampsia through technology

Pre-eclampsia accounts for a third of all maternal deaths in Pakistan but there remains a widespread lack of knowledge about its causes and warning signs



Every day, lady health workers (LHWs) go door to door in rural and urban parts of Pakistan to provide access to basic healthcare services. They represent a vital source of health information and preventive care services that can help

avert the onset of life-threatening complications caused by common pregnancy-related disorders. Among these common pregnancy-related disorders, pre-eclampsia accounts for a third of all maternal deaths in the country but there remains a

widespread lack of knowledge about its causes and warning signs.

“There is no word for pre-eclampsia in prominent regional languages like Sindhi. Unlike other childbirth complications, signs of pre-



eclampsia cannot be identified easily which limits the chances of early detection and leaves many pregnant women vulnerable to its dangerous complications,” says Dr Rahat Qureshi, an associate professor in the department of obstetrics and gynaecology at the Aga Khan University.

The Community Level Interventions for Pre-eclampsia (CLIP) intervention sought to evaluate the feasibility of a low cost, technology-focused approach to tackling pre-eclampsia and eclampsia through LHWs. Over three years, 250 LHWs visited 88,000 households in Matiari and Hyderabad to screen pregnant women for symptoms of the disease.

The LHWs asked mothers about a variety of symptoms related to pre-eclampsia and also measured their blood pressure and oxygen saturation levels. This information was then entered on the spot into a smartphone-based mobile health application, PIERS On the Move, which conducted a quick assessment of the risk of severe pre-eclampsia.

In cases where warnings signs were noted, the LHWs were trained to provide prompt treatment by providing anti-hypertensive tablets and/or by administering magnesium sulphate injections. They also created awareness about antenatal care seeking and birth preparedness during pregnancy and referred at-risk mothers to the nearby hospitals.

Researchers noted widespread support for the initiative from the community which reached 39,444 pregnant women in the two districts of Sindh. Results from the trial showed a marked improvement in awareness of the disease and in health-seeking behaviour. More than three in four at-risk mothers listened to the LHWs by seeking a referral and nearly 60 per cent of women accepted the treatment offered by them.

“CLIP demonstrates how we can enable the LHWs to tackle relevant health problems through training and the use of low-cost technology. Most pregnant women were willing to follow timely advice and treatment which helped make their

pregnancies safer,” Dr Rahat added. The research team now plans to conduct a follow-up study of the LHWs involved in the programme to evaluate their experiences of using technology to assess the health of pregnant women during the trial. The objectives of the study are in line with global efforts to achieve targets under goal 3 of the Sustainable Development Goals. Goal 3: ensure healthy lives and promote well-being for all at all ages, calls for special efforts to reduce preventable deaths of mothers and newborns by 2030.

Funded by the Bill and Melinda Gates Foundation, the CLIP trial in Pakistan was conducted in partnership with faculty from the University of British Columbia in Canada and St George’s, University of London, in the United Kingdom.

It is part of a multi-county study that conducted similar interventions in India, Nigeria and Mozambique.

Dr Rahat Qureshi, Associate Professor, Obstetrics and Gynaecology

AKU's Sarah Savant wins research grant

**AKU researcher awarded €1.8m by European Research Council
Dr Sarah Bowen Savant's KITAB project will provide new cultural insights from over 6,000 Arabic texts from the pre-modern Islamic world**



influential period of Islamic history. Dr Sarah Bowen Savant, an associate professor at the Institute for the Study of Muslim Civilisations, has won €1.8 million from the European Research Council to support the development of her KITAB project that is providing new cultural insights from over 6,000 Arabic texts from the pre-modern Islamic world.

Dr Savant describes how the medieval Arabic textual tradition is one of the most prolific in human history. "Works were produced across a territory stretching from modern Spain to Central Asia, and their subject matter covered Islam but also much more, from rulers, their courts, and administration to literature, biographies, philosophy, medicine, mathematics, geography, travel, and many other topics," she adds.

The grant will support development of data visualisations and analytics spanning the entire corpus of work under the project, as well

KITAB is an online toolbox created by an international team of experts in information technology, Arabic history and philology (the study of the development of languages). Its central innovation has been the use of algorithms to identify common and repeated passages in separate texts thereby shedding light on how ideas and memory were recorded and shared during this rich and

as expenses in expanding on the existing team's work to explore how Islamic heritage was shaped and filtered during the period. "KITAB is a group endeavour that depends entirely on teamwork," Dr Savant says. "A group of incredibly dedicated volunteers have contributed vast amounts of skills and time to get us to this point and this grant allows us to hire people who will enable us to build a completely new picture of how memory functioned and ideas travelled across time and the regions of the Middle East."

The grant will support development of data visualisations and analytics spanning the entire corpus of work under the project

Dr Sarah Bowen Savant,
Associate Professor, Institute for the Study of Muslim Civilisations

Improving young children's reading skills

IED wins a competitive research grant to study the impact of an early grade reading intervention in Sindh

The Aga Khan University's Institute for Educational Development (AKU-IED) has won a competitive research grant worth around Rs10 million via a USAID-funded Sindh Capacity Development Project to study the impact of an early grade reading intervention in Sindh – the Sindh Reading Programme (SRP).

The SRP has been working in eight districts of Sindh since 2014 to develop reading abilities of early graders (grades 1 and 2) in their local languages, either Urdu or Sindhi. The SRP interventions include teacher training and the provision of supplementary reading material that introduce phonetics as a way to enhance reading abilities for early graders.



The research project titled 'Early Grade Reading Innovations for Quality Education: Prospects for Scaling up' has developed a mixed methods design, which aims to determine the effect of intervention on students' learning.

The quantitative part of research includes assessment of grade 3 students on their reading abilities to determine the effect of the intervention. It also includes classroom observation of teachers' pedagogy and questionnaire from parents to explore the factors that may explain the reason behind the effect or otherwise of the intervention.

The qualitative part of the research design includes in-depth interviews

with teachers, head teachers, district government officials, government leadership in education and SRP leadership. The qualitative part aims to explore the process adopted by the intervention, the process bottlenecks it encountered, system related issues and issues with the training and material usage.

Findings will be shared with all stakeholders including policy makers for critical reflections and possible policy shifts.

Dr Sajid Ali, *Associate Professor, Institute for Educational Development*

Dr Sadia Muzaffar Bhutta, *Assistant Professor, Institute for Educational Development*



Students who excel in mathematics and science possess the skills needed to innovate and to power Pakistan's progress," says Dr Sadia M. Bhutta

Exploring the impact of maths and science teaching

Researchers will analyse how educators perceive existing educational methods and identify teaching approaches which give students the strongest grasp of concepts

The Higher Education Commission (HEC) has granted funding for an innovative study designed to identify how different methods of teaching mathematics and science can improve children's understanding of these key subjects.

The project titled 'Assessing Teachers' Pedagogical Practices and Students' Learning Outcomes in Mathematics and Science Across Primary and Secondary School Levels: A Nationwide Study' will be conducted by Dr Sadia Bhutta and Dr Nusrat Fatima Rizvi from the Aga Khan University's Institute for Educational Development (IED) over a period of at least three years. During this period, the researchers

will analyse a demographically representative sample of children and teachers across the country to gather evidence on how educators perceive existing educational methods and to identify teaching approaches which give students the strongest grasp of concepts in these two areas.

"Students who excel in mathematics and science possess the skills needed to innovate and to power Pakistan's progress. By evaluating the value of teaching methods in these two subjects in classrooms across the nation, we will be able to recommend initiatives that will raise teaching and learning standards across the country," said Dr Bhutta, an assistant professor at IED.

"Through our findings, we also hope to support the government's efforts to achieve commitments under Goal 4 of the Sustainable Development Goals (SDGs) relating to education.

"Achieving the targets set under the SDGs related to proficiency in mathematics and competency in technical skills will go a long way towards boosting the employment and entrepreneurship prospects of the next generation of Pakistanis," she added.

Commenting on the need for such a study, Assistant Professor Rizvi added that there were still doubts among stakeholders in the education sector on how improvements in

teaching methods translate to better learning outcomes for students.

"Besides finding out which teaching approaches are the best for students, our project will also incorporate findings into professional development programmes for educators so that we can immediately realise the benefits of the research."

The project will launch soon.

Dr Sadia Muzaffar Bhutta,
Assistant Professor, Institute for Educational Development

Dr Nusrat Fatima Rizvi,
Assistant Professor, Institute for Educational Development

Easing the emotional toll of cancer

AKU researcher has won a global grant which will enable him to create a customised website and mobile application to improve access to information for advanced breast cancer patients in Kenya

Ann Marie* has been feeling anxious since the day she was first told about her late-stage cancer. Uncertainty about her health is a constant in her life and symptoms as trivial as a runny nose can unnerve her. Lately, her visits to the doctor haven't been helpful either as information about her disease only makes her feel more isolated, as though no one else can relate to the daily struggle of living with cancer.

Ann Marie's experience is unfortunately very common as many women suffering from late-stage cancer receive no services, referral or guidance to help them with their emotional distress. Studies show that

up to half of women with advanced breast cancer stage 3 or stage 4 suffer from anxiety or clinical depression.

Studies show that up to half of women with advanced breast cancer stage suffer from anxiety or clinical depression

"The presence of social support resources and information that's relevant to emotional needs has

a strong influence on a patient's quality of life and the speed of their recovery. Making these resources available can go a long way towards tackling the emotional toll of living with cancer," says Dr Asim Jamal Shaikh, assistant professor in the department of internal medicine at the Aga Khan University and head of medical oncology division at the Aga Khan University Hospital, Nairobi.

Dr Shaikh, an alumnus from the AKU's fellowship programme in medical oncology, has recently won a global grant that will enable him to create a customised website and mobile application that will improve access to information for advanced



breast cancer patients in Kenya. The initial stages of the project will see Dr Shaikh collaborate with the oncology sections of four public and private hospitals in urban and rural parts of Kenya to assess the specific needs of cancer patients through a needs assessment and quality of life survey.

Patients will be able to download important educational material and the customised website will also act as a forum which collates links to relevant local and regional resources for cancer patients.

The project has received grant funding through a SPARC grant:

a global competition run by the Union of International Cancer Control, an advocacy group which represents the world's major cancer societies, ministries of health and patient communities.

The initiative's goals are in line with the vision of National Cancer Control Strategy 2017–2022 prepared by Kenya's ministry of health.

The plan's strategic objectives call for special efforts to raise awareness of cancer among the public, to conduct research on how to improve the effectiveness of cancer treatment, and to understand the impact of communication tools and

platforms on cancer prevention, early diagnosis and screening.

The grant also corresponds with targets related to goal 3 in the global Sustainable Development Goals: ensure healthy lives and promote well-being for all at all ages.

Targets under the goal support efforts to improve mental health and to tackle the burden of non-communicable diseases such as cancer.

**The patient's name has been changed to protect her identity.*

Dr Asim Jamal Shaikh, Assistant Professor, Internal Medicine

IN THE NEWS

Dawn reports on AKU's economic impact in Pakistan

A study of AKU's economic impact in Pakistan, conducted by Washington-based Centennial Group International, reveals that in one year the institution has an economic impact in the country of more than Rs103 billion or \$1 billion and supports nearly 42,000 jobs.

The study also reports that AKU's spending has a multiplier effect, with every rupee of its direct gross value added generating Rs7.3 in economic benefits. "Too often, the significant contribution that a leading university makes to the economy is overlooked," said AKU President and CEO Firoz Rasul.

The article was published in Dawn on January 11, 2018

The News reports on revision of LHS's curriculum in Sindh based on findings of AKU study

The Sindh government has approved a major revision of the curriculum for lady health supervisors (LHSs) in a move aimed at improving the quality of door-to-door preventive health services delivered by lady health workers (LHWs) across the province.

The new curriculum, which incorporates the latest treatment guidelines for pneumonia and diarrhoea, two preventable diseases that caused over 670,000 deaths in the country in 2015, was unveiled during a meeting of provincial stakeholders and researchers involved in the Nigraan Plus study at the AKU. It includes directives on how LHSs can effectively support and supervise the work of LHWs, thereby empowering them to apply the latest knowledge and clinical skills to manage pneumonia and diarrhoea at early stages.

The article was published in The News on March 28, 2018

The Express Tribune reports on Harvard-AKU collaboration to test novel imaging 'pill'

AKU researchers have partnered with faculty at the Massachusetts General Hospital, an affiliate of Harvard Medical School, to test a novel pill-shaped imaging device that can offer a low-cost and non-invasive method to understand the causes of malnutrition in children.

This is the first-ever test outside the US of this optical device which provides high resolution images of the inside of a patient's gastrointestinal tract. Ongoing research at AKU under the SEEM grant, which is funded by the Bill and Melinda Gates Foundation, is studying if malnourished children have a different set of bacteria in their intestines that limit their growth potential and reduce their immunity to disease.

The article appeared on www.tribune.com.pk on February 16, 2018

Reuters reports on emergence of drug-resistant typhoid strain in Pakistan

Researchers from Britain's Wellcome Sanger Institute who analyzed the genetics of the typhoid strain found it had mutated and acquired an extra piece of DNA to become resistant to multiple antibiotics. An outbreak of drug-resistant typhoid that began in Hyderabad in Pakistan in November 2016 is still spreading, according to AKU researchers who worked with the Sanger team.

Scientists at Sanger were contacted in the spring of 2017 and asked to genetically analyze samples. The team found it was being caused by a strain known as H58, which is already known to be linked to drug-resistant cases. Looking further, they found this H58 strain had gained an extra strand of bacterial DNA – a plasmid – that encoded for additional antibiotic resistance genes.

The article was published on www.reuters.com on February 20, 2018

Business Post reports on AKU-Harvard's joint launch of leadership course in Nairobi

The Aga Khan University School of Media and Communications (GSMC) in Nairobi together with the John F. Kennedy School of Government at Harvard University launched in March, 2018 a Transforming Leadership for 21st Century Africa Programme.

This first-of-its-kind programme marks the first time Harvard Kennedy School (HKS) has collaborated with a university in the region to offer a leadership course. The programme will help executives exercise leadership amid uncertainty with skill, purpose and effectiveness.

The article appeared on www.businesspost.ng on March 15, 2018

Engaging faculty in research to improve teaching

Scholarship of Teaching and Learning (SoTL) promotes teaching as a scholarly endeavour aimed at improving one's own classroom as well as advancing the larger profession of teaching

The AKU-wide Network of Teaching and Learning (TL-net) housed in the Office of the Provost was established in 2013 with an aim to support excellence in AKU academic programmes and to ensure a strong student learning experience that enables AKU graduates to meet their programme learning outcomes.

SoTL promotes teaching as a scholarly endeavour aimed at improving one's own classroom as well as advancing the larger profession of teaching. It engages individuals in designing, conducting, and publishing research on teaching and learning. In October 2015, TL-net launched the first call for grant applications in the area of SoTL and each year since then US \$15,000 are allocated to fund these studies.

As part of the grant programme, an open call is initiated to seek

applications from the faculty members across all AKU teaching sites. Applications go through double blind review by the members of the Teaching and Learning Advisory Body.

The funding is released to successful applications after ethical clearance is received for the study. During the three rounds of SoTL grant applications, the TL-net has funded 12 research studies, a third of all applications with grants worth a total of \$US 38,824.

The research projects that have received funding include: investigation of a variety of areas in teaching and learning; measuring effectiveness of various teaching and learning strategies e.g. marker's approach, nurse-led clinical teaching rounds, blended learning, simulations, etc. on faculty experiences and students' learning experiences; measuring



Dr Hasan Salman Siddiqi, SoTL grantee, presenting a paper at SoTL conference in 2017.

learning outcomes including critical thinking skills, clinical reasoning skills and reflective thinking skills. Successful researchers who obtained the grant were from Medical College-Pakistan (including Department of Educational Development and Centre for Innovation in Medical Education); School of Nursing and Midwifery, Karachi; School of Nursing and Midwifery, Uganda, and Institute for Educational Development, East Africa.

Grantees have shared the outcomes of their study at the Bi-ennial TL-net SoTL conference, faculty councils, research assemblies, local and international conferences and many of them are working on publishing their research in local and international academic journals to disseminate their findings to a wider audience.

Network of Teaching and Learning, Office of the Provost

Sindh Government supports scaling up of Nigraan project

Nigraan, an innovative research and capacity building project, has been extended to a second district in rural Sindh, Mirpurkhas, under the project name, Nigraan Plus



Nigraan, an innovative research and capacity building project, was extended to a second district in rural Sindh, Mirpurkhas, under the project name, Nigraan Plus. The Nigraan Plus project was formally launched by the Sindh health secretary and AKU's department of community health sciences (CHS) at an event in February 2017.

The initial phase of the Nigraan project in Badin had helped lady health workers (LHWs) and lady health supervisors (LHSs) to manage potentially fatal diseases in children such as pneumonia and diarrhoea, which lead to over 140,000 child deaths a year equating to 46 per cent of all child deaths in Pakistan before the age of five. Since the majority

of deaths from these two diseases occur in home, Nigraan focused on boosting the knowledge, skills and performance of LHSs – who supervise the performance of LHWs – and LHWs who provide relevant home-based health services to communities.

Nigraan introduced LHSs to supportive management practices

that resulted in provision of adequate care during visits to households. In Badin, the LHSs noted a doubling in their supervision skill scores – a remarkable improvement on their ability to provide quality support to LHWs in the field. The ability of LHSs to correctly diagnose and treat diarrhoea and pneumonia also improved markedly. Moreover, LHWs who were supervised by the Nigraan-trained LHSs, showed improvement in their ability to correctly manage diarrhoea and pneumonia in children under five compared to those outside the programme.

In the next phase of the project, Nigraan Plus will introduce similar evidence-based, supportive supervision system practices in Mirpurkhas so that healthcare workers can correctly detect, diagnose, report and treat cases of pneumonia and diarrhoea at an early stage. Nigraan Plus is also training the LHWs to use their mobile phones to record and relay data about children suffering from pneumonia and diarrhoea to their supervisors. The LHSs use this information to maintain location-specific records on these diseases and to coordinate visits by the LHWs. The upscale Nigraan Plus's system

of constant training, feedback and community visits not only builds the capacity of healthcare workers but also ensures that at-risk children get the attentive care they need at their doorstep. In the long term, such interventions will help Pakistan achieve targets under Sustainable Development Goal 3 on reducing childhood mortality. The first phase of the Nigraan project was funded by the Alliance for Health Policy and Systems Research, an

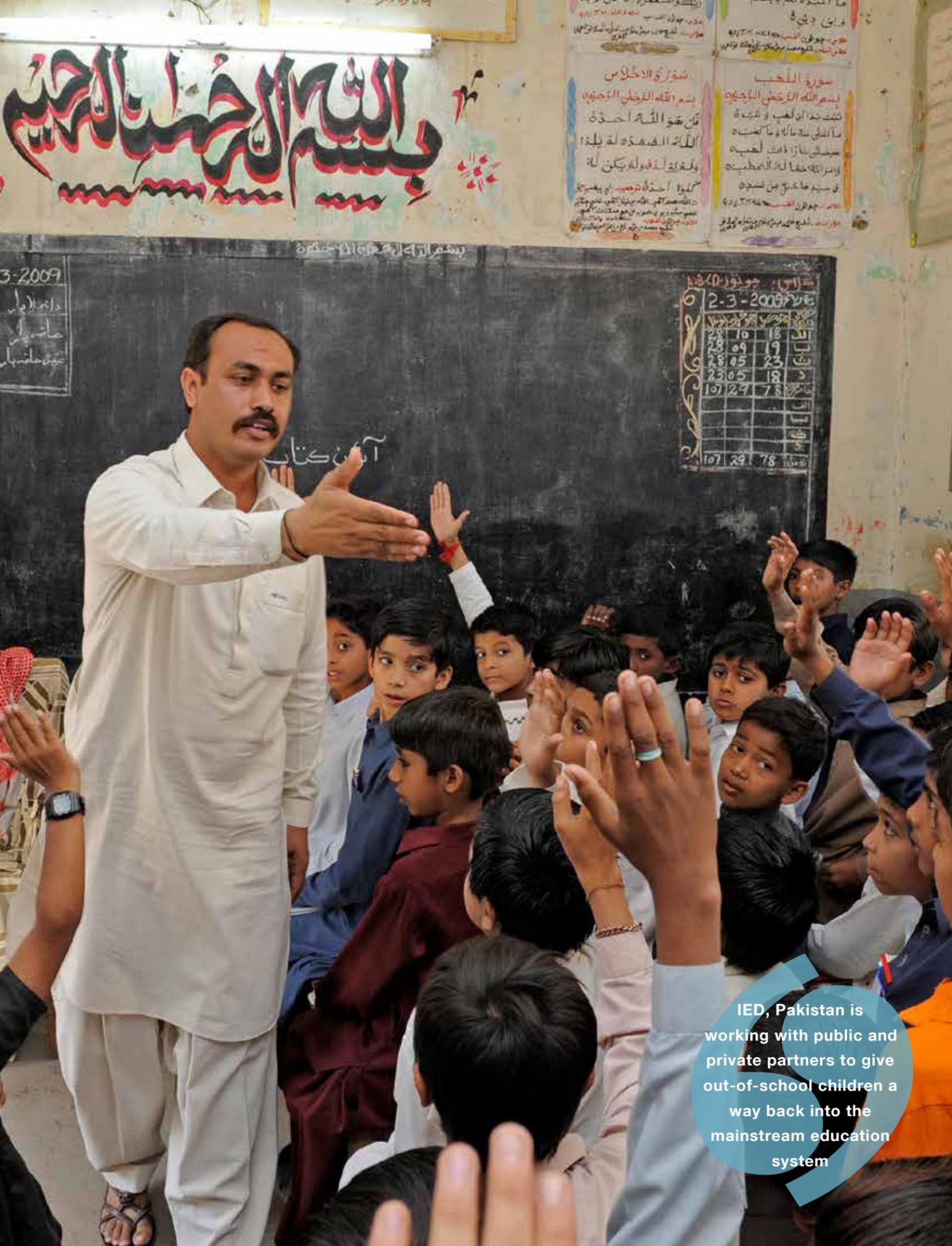
international collaboration hosted by the World Health Organization. Nigraan Plus is part of the Umeed-e-Nau project that is being implemented by AKU in collaboration with Pakistan's provincial health ministries with support from the Bill and Melinda Gates Foundation. The Centre of Excellence Women & Child Health and the CHS at AKU Karachi are the key research implementers.

Professor Fauziah Rabbani,
Associate Vice Provost
(Health Sciences)

The project introduced LHSs to supportive management practices that resulted in both the LHWs and the LHSs providing adequate care during house visits

Sindh Health Secretary Dr Fazlullah Pechuho and Professor Fauziah Rabbani, chair of the Department of Community Health Sciences, mark the launch of the Nigraan Plus project at an event held at AKU, Karachi campus.





IED, Pakistan is working with public and private partners to give out-of-school children a way back into the mainstream education system

Pathways back to education

Leaving school early has lifelong consequences for Pakistan's youth as it excludes them from skilled professions while the disruption to their education hurts their ability to re-join the education system

An alarming 22.6 million children in Pakistan are currently out of school. The grim reality of this statistic is that four of ten children leave the education system before the age of 16 without a matriculation certificate, a basic requirement for most employers and all universities.

Leaving school early has lifelong consequences for Pakistan's youth as it excludes them from skilled professions while the disruption to their education hurts their ability to re-join the education system.

Aga Khan University's Institute for Educational Development (IED) is working in partnership to give these out-of-school children and teenagers a way back into the mainstream education system through non-formal basic education. The partners on this project include the Japan International Cooperation Agency (JICA) and the Sindh government's

Directorate of Non-Formal Education and Literacy (NFLE).

Non-formal basic education (NFBE) consists of an accelerated curriculum aimed at providing basic numeracy and literacy skills to those outside the formal school system. Lessons take place in local settings such as community centres or homes with mixed classes of students from a variety of ages between five and 16.

The action research project will see researchers from the IED evaluate teaching practices in eight such NFBE centres in marginalised areas of Karachi.

Researchers will be much more than observers as they will also suggest improvements in instruction methods to help teachers get the most out of students. The impact of these new approaches will also be analysed so that researchers can determine the

teaching, learning and assessment methods which are most suitable for scale-up in other NFBEs across Sindh.

"Teachers will need to adopt different strategies to engage learners of different ages who come from very different backgrounds," said Dr Dilshad Ashraf, an associate professor at IED. "Our goal is to partner with teachers in class so that we jointly determine the most effective methods to help out-of-school children catch up to their peers."

The year-long project will see students taught a curriculum developed by the Sindh government's NFLE, Bureau of Curriculum and Extension Wing and Sindh Textbook Board under the Advancing Quality Alternative Learning project sponsored by JICA.

Dr Dilshad Ashraf, Associate Professor, Institute for Educational Development



We need little acorns to grow big oak trees!

SONAM-EA students' research paper published in a British peer-reviewed midwifery journal

In large organisations, it is often the big grants and high-profile publications that attract attention.

However, sometimes we forget that every researcher starts from small beginnings. The AKU School of Nursing and Midwifery in East Africa (SONAM – EA) is committed to empowering its students in developing research expertise.

Three students undertaking the upskilling programme from diploma to degree aspired to undertake a research project in order to explore the knowledge of midwives around the Baby-friendly Hospital Initiative (BFHI) launched by the World Health

Organization and the United Nations International Children's Emergency Fund in 1991. The BFHI is a global effort to implement practices that protect, promote and support breastfeeding. It recommends that all healthcare staff follow 10 steps to ensure new mothers have the best evidence-based guidance to ensure successful breastfeeding which is the best way to protect babies from infection. This guidance is essential in Uganda, where the infant mortality rate from infection is very high.

Jaliah Namutebi, Hanifah Nakanwagi and Leila Naluyima, who were provided with necessary supervision throughout the research process,

progressed from complete novices to producing an excellent piece of research titled 'Midwives' Knowledge of Baby Friendly Hospital Initiative in Uganda', which has lately been published in a British peer-reviewed midwifery journal.

With the help of their research work, the students were able to demonstrate that midwives' knowledge around the initiative was poor while advice given to new mothers was often conflicting.

Results from the research will be presented to BFHI managers.

Dr Grace Edwards, *Professor, School of Nursing and Midwifery*

It begins with a KISS

Study has evaluated the association between a particular protein and positive pregnancy outcomes after intracytoplasmic sperm injection treatment



Researchers at the Aga Khan University have found that higher concentration of serum Kisspeptin, a protein that is encoded by the KISS1 gene in humans, is a positive predictor of pregnancy after intracytoplasmic

sperm injection (ICSI) treatment. The study, undertaken by a group of researchers at the department of biological and biomedical sciences, suggests that higher levels of Kisspeptin leads to greater chances

of oocyte maturation, preparation of endometrial bed and successful pregnancy especially in cases where cause of infertility was unexplained. Fertility is established by union of male and female germ cells. These



cells are produced by specific glands testis and ovaries in males and female individuals respectively.

The reproductive functions are subsequent to release of series of hormones from hypothalamus, anterior pituitary, and ovaries/testes. Kisspeptin belongs to a group of hormones, encoded by the gene KISS1 which is released from hypothalamus.

It has been observed that inactivation of Kisspeptin or its receptor has resulted in pubertal failure as well as infertility. This is because it causes release of the main hormone gonadotropin releasing hormone (Gn RH) which, as its name signifies, causes development of gonads, onset of puberty and facilitates release of other hormones required for fertility.

Inactivating mutations of its receptor for Kisspeptin (KISS1R) have been isolated in patients with abnormal development of gonads.

In a population, administration of Kisspeptin injections reversed fertility with increase in sex hormones that control the menstrual cycle. Moreover, a rise in GnRH secretion was noticed by the injection of Kisspeptin with increased secretion of subsequent hormone; luteinizing hormone (LH). A number of researchers have proved role of Kisspeptin in hypothalamic amenorrhea (no female cycle due to cause in hypothalamus) and hypo gonadotropic hypogonadism (reduced development of gonads due to cause in hypothalamus) yet its role on reproductive axis in terms of fertility has yet to be discovered.

The researchers postulated that Kisspeptin deficiency may lead to failure of conception/implantation after assisted reproductive techniques (ART). Therefore, research concept was secured with a Seed Money Grant by AKU and Pakistan Health Research Council. The study evaluated the association between Kisspeptin and positive

pregnancy outcomes after one of the techniques of ART; ICSI treatment.

To move further, the researchers investigated the role of Kisspeptin on sperm count, motility and morphology in fertile and infertile males and found out that the neuropeptide plays an important role in male fertility by increasing the production of hormones of the male reproductive axis namely follicle stimulating hormone (FSH), LH and testosterone. A way forward is to explore whether injections of Kisspeptin can be given to infertile females for maturation of eggs and improvement in endometrial thickness and males for improving the male reproductive hormones or not. The outcome will be a sense of satisfaction and achievement for those who care for the agonising pain faced by the infertile couples.

Dr Rehana Rehman, Associate Professor and Vice Chair, Research & Graduate Studies, Biological and Biomedical Sciences

AKU researcher attends global summit on human genetics

Dr Syeda Sadia Fatima receives training for next-generation sequencing, cytogenetics, molecular genetics and clinical bioinformatics



Dr Syeda Sadia Fatima is the only researcher from Pakistan to have successfully secured a four-week training scholarship to attend the International Summit in Human Genetics and Genomics in Maryland, USA.

A total number of 26 participants from 25 different countries received this grant to attend the summit organised by the National Institutes of Health (NIH) last year.

Genetic disorders contribute significantly to the world's burden of disease. Many countries do not

have genetically trained researchers and healthcare professionals available to address this burden, or the training to correct this deficit.

As a consequence, opportunities to reduce the burden of disease are frequently missed. Acquiring and applying knowledge about genetics and genomic research through training programmes like the international summit make it possible to anticipate, prevent, diagnose and treat many genetic and congenital birth defects, alleviating the burden these diseases have on individuals, their families and their nations.



A total number of 26 participants from 25 different countries were invited to attend the summit organised by NIH

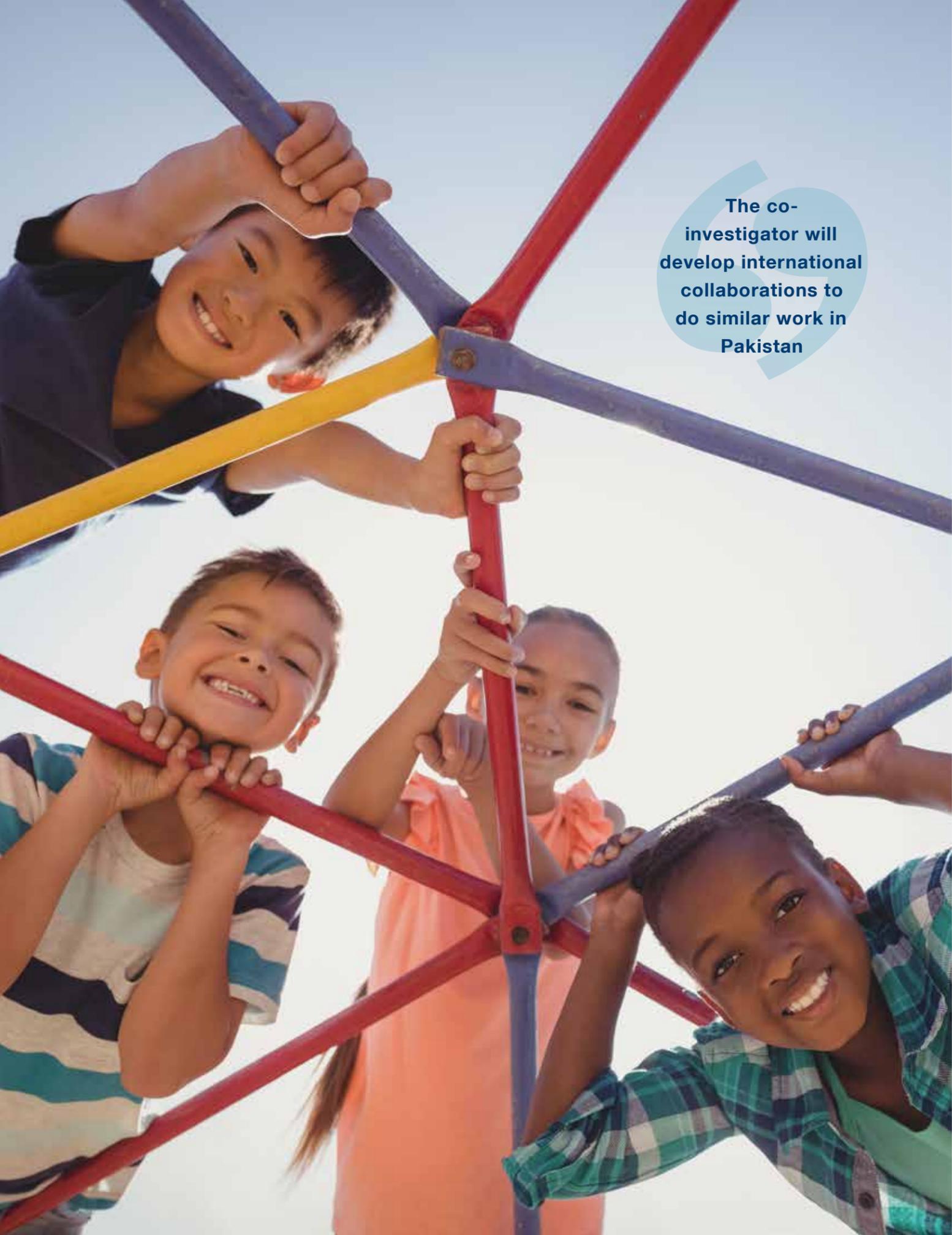
The training was part of a five-year initiative designed to support developing nations build and expand their knowledge base, infrastructure, systems, research efforts and

technologies in human genetics and genomics. The initial week showcased lectures delivered by renowned scientists from the human genomics project on emerging topics concerned with genetics and its implication on health and disease.

Field trips to hospitals such as Johns Hopkins University, MedStar Washington Hospital Centre, Children's National Health System and to the state-of-the-art laboratories such as GeneDx, Kennedy Krieger Institute, NIH Intramural Sequencing Centre and the Volpe Research Center (NIST campus) were also arranged.

Furthermore, each participant was assigned a mentor for advanced training relating to their area of interest. Dr Fatima was assigned with a lab dealing with state-of-the-art obesity research at the National Institutes of Child Health and Disease. She received training for next-generation sequencing, cytogenetics, molecular genetics and clinical bioinformatics besides observing experiments on zebra fish and mouse models for obesity.

Dr Syeda Sadia Fatima, *Assistant Professor, Biological and Biomedical Sciences*



The co-investigator will develop international collaborations to do similar work in Pakistan

Faculty participates in a multimillion euro international project

The €3 million implementation research is part of the Research Group Village of the Ludwig Boltzmann Gesellschaft in cooperation with the Medical University of Innsbruck, Austria

Dr Batool Fatima, an assistant professor of Human Development Programme at the Aga Khan University, is one of the co-investigators of a project titled 'The Village – How to raise the village to raise the child'. Other team members are from Austria, Australia, Germany, Norway and the UK.

The community-based project is designed to promote improvements in collaboration among helper systems and caregiver structures and is tailored to the needs of children of mentally ill parents. The aim is to promote the mental health and quality of life of children and adolescents through early recognition of problems

by the community and the provision of child-appropriate forms of assistance. This €3 million implementation research is part of the Research Group Village of the Ludwig Boltzmann Gesellschaft (LBG) in cooperation with the Medical University of Innsbruck, Austria.

The Federal Ministry of Education, Science and Research, Austria is funding the LBG research group.

The project will co-develop, implement and evaluate practice using a collaborative village approach.

This mixed-methods project will utilise a realist framework, involving

numerous data collection methods including: literature reviews, questionnaires, focus groups, interviews, and observations.

The project seeks to break the cycle of trans-generational transmission of poor (mental) health, and improve child development and quality of life in Austria cost-effectively.

The co-investigator from Pakistan will provide technical input and in the process will develop international collaborations and partnerships to do similar work in the country.

Dr Batool Fatima, Assistant Professor Human Development Programme

AKU professor featured in Franco-German TV film



A team of ARTE, a TV network, travels with Professor Stephane Pradines to Tanzania to film a documentary on Swahili culture

Spanning over two decades, Dr Stephane Pradines' work focuses on the early stages of the Muslim connections with East Africa through trading communities of the Indian Ocean; and how trade propagated Islam in sub-Saharan Africa. This point is crucial to understanding the beginning of the Swahili culture.

In December 2017, a team of Franco-German TV network, ARTE, travelled with Dr Pradines to Tanzania to film a documentary on the Swahili culture and his excavations there. During the documentary, Dr Pradines discussed significant stages of the project like

the excavations of Kilwa, Swahili medieval harbour of Tanzania, and particularly investigations on the sites of Songo Manara and Sanje ya Kati. He noted how his archaeological project was not only linked to a conservation project and a regional development programme led by the United Nations Educational, Scientific and Cultural Organisation, the French and the Japanese embassies but was also developed as a field school in archaeology and conservation.

As the project continues, new excavations are planned in Mafia, Tanzania with a grant by the University Research Council (URC). The URC grant will help understand the life and the development of a major Swahili archaeological site, Kua. This research project will explore the architecture, stone houses, palaces and mosques, but also the material culture with the ceramics and other traded objects

and finally the immaterial culture with the oral traditions on the island including boat (dhow) construction.

With two field schools (archaeology & conservation), this project provides key strategic support for the University in East Africa, in terms of research, education, heritage and tourism development. The partnership with Tanzanian institutions such as the Antiquities and University of Dar-es-Salaam will fully support the development of the AKU in Tanzania and also the engagement of the Aga Khan Development Network in Mombasa. The ISMC is working in partnership with the World Monument Fund, the Tanzanian Department of Antiquities and Dar-es-Salaam University.

Dr Stephane Pradines,
Professor, Institute for the Study of Muslim Civilisations



Leading global science publication interviews AKU researcher

Faculty's work offers deep insights into the biology of brain-eating amoebae

Being multicellular (composed of collection of cells) eukaryotes, humans during evolution have modified their cellular receptors and proteins with respect to the requirements that were imposed on them.

The lead researcher, Dr Abdul Mannan Baig, and his group experimented with a few US Food and Drug Administration (FDA) approved non-antibiotic drugs on primitive unicellular eukaryotic cells like *Acanthamoeba* and *Naegleria fowleri*.

The foundation behind the in-vitro testing of different FDA approved drugs was the hypothesis that if human like receptors and ion-channels were expressed in their primitive forms in *Acanthamoeba*

and *Naegleria fowleri*, they could be targeted by these drugs to kill these disease-causing amoebae.

Funded initially by the departmental grant, and later by AKU seed money grant, the initial findings were published in 2013, which showed the effects of these drugs in *Acanthamoeba* and then on related human disease-causing amoebae like *Balamuthia mandrillaris* and *Naegleria fowleri*.

This research was novel in that, there were no studies done in the past that had reported the growth inhibitory or amoebicidal effects of drugs like Procyclidine, Loperamide, Amlodipine, Prochlorperazine and Haloperidol in these unicellular

diseases causing eukaryotes. Interestingly, on evolutionary timeline these single-celled amoebae exist at a distance of around 2.5 billion years from the multicellular human beings, but both are fundamentally eukaryotes.

In the past four years, with a series of publications, the team was able to report the evidence of the presence of *Acanthamoeba* muscarine binding (AMB) human-like muscarinic receptors, voltage-gated ion-channels, enzymes, cellular protein pumps and proteins like Na-K ATPase and calmodulin in this model unicellular eukaryote that have a substantial homology with their human counterparts. Many of the drugs that they experimented with

are used in humans as antagonist of human GPCRs and ion-channels. Of the unicellular eukaryotes, *Acanthamoeba castellanii* has its entire genome sequenced and deposited at sites like AmoebaDB.org.

Methods like the use of bioinformatics computational tools, immunocytochemistry, growth assays with receptor specific antagonist and cytotoxicity assays showed the evidence of the expression of the proteins that are known targets of the above-mentioned drugs.

In the year 2017, the group was able to provide the novel evidence of production of a chemical acetylcholine (ACh) that binds the AMB receptor and the enzymatic

cascade needed for the synthesis of ACh in *Acanthamoeba* specie. They also reported a similar receptor in the brain-eating amoeba, the *Naegleria fowleri*.

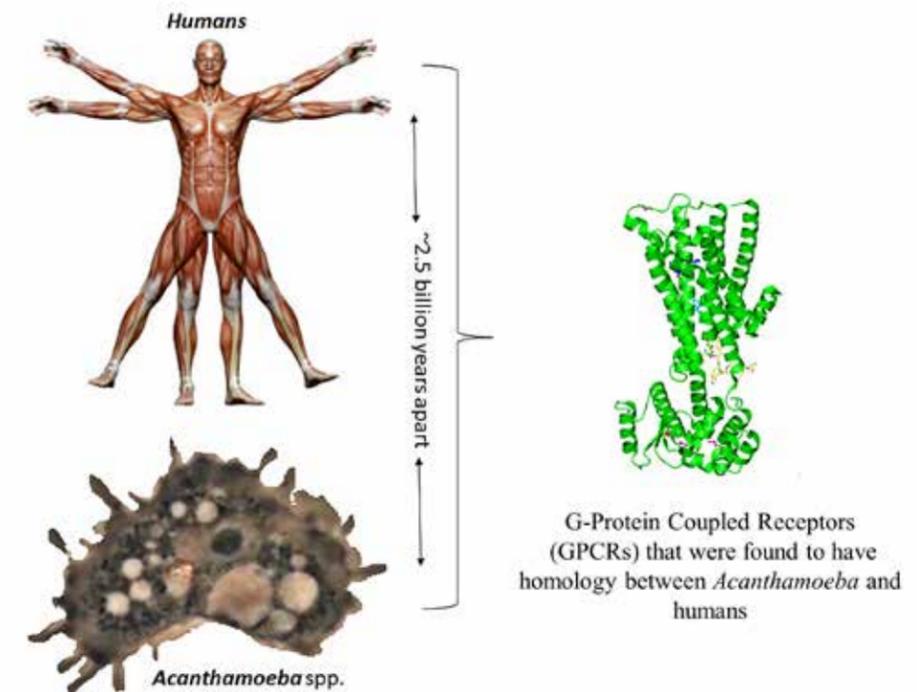
These discoveries caught the attention of leading international science journals and news outlets and the findings were highlighted by the magazine New Scientist and The Washington Post.

The lead researcher was interviewed twice by the New Scientist magazine in the past three years. The translational value of the discovery of ACh and its receptor in these microbes could be gauged by the fact that the research was able to show that an infection of the eye

(*Acanthamoeba* Keratitis) caused by this microbe had responded to a muscarinic receptor antagonist atropine in the past, an observation that got overlooked at that time. In a publication, they had drawn the attention towards this occurrence, reported previously by several other scientists.

The lab members continue to work in this direction and have projected their discoveries on this microbe to the roles of similar GPCRs and ion channels in diverse diseases like prostate cancer, on which they have published a paper in 2017.

Dr Abdul Mannan Baig,
Senior Instructor, Biological and Biomedical Sciences



Institutional Biosafety Committee set up



The Institutional Biosafety Committee (IBC) has been formed which will be chaired by Dr Erum Khan, professor, department of pathology and laboratory medicine. The AKU-IBC will act as an institutional review body, responsible for the oversight of all research activities including teaching laboratories involved in working with hazardous biological material as required by national and international obligations.

The objective is to facilitate faculty and research staff to perform risk assessment for their projects and ensure safe practices. In order to maintain safe conditions and regulatory compliance in research

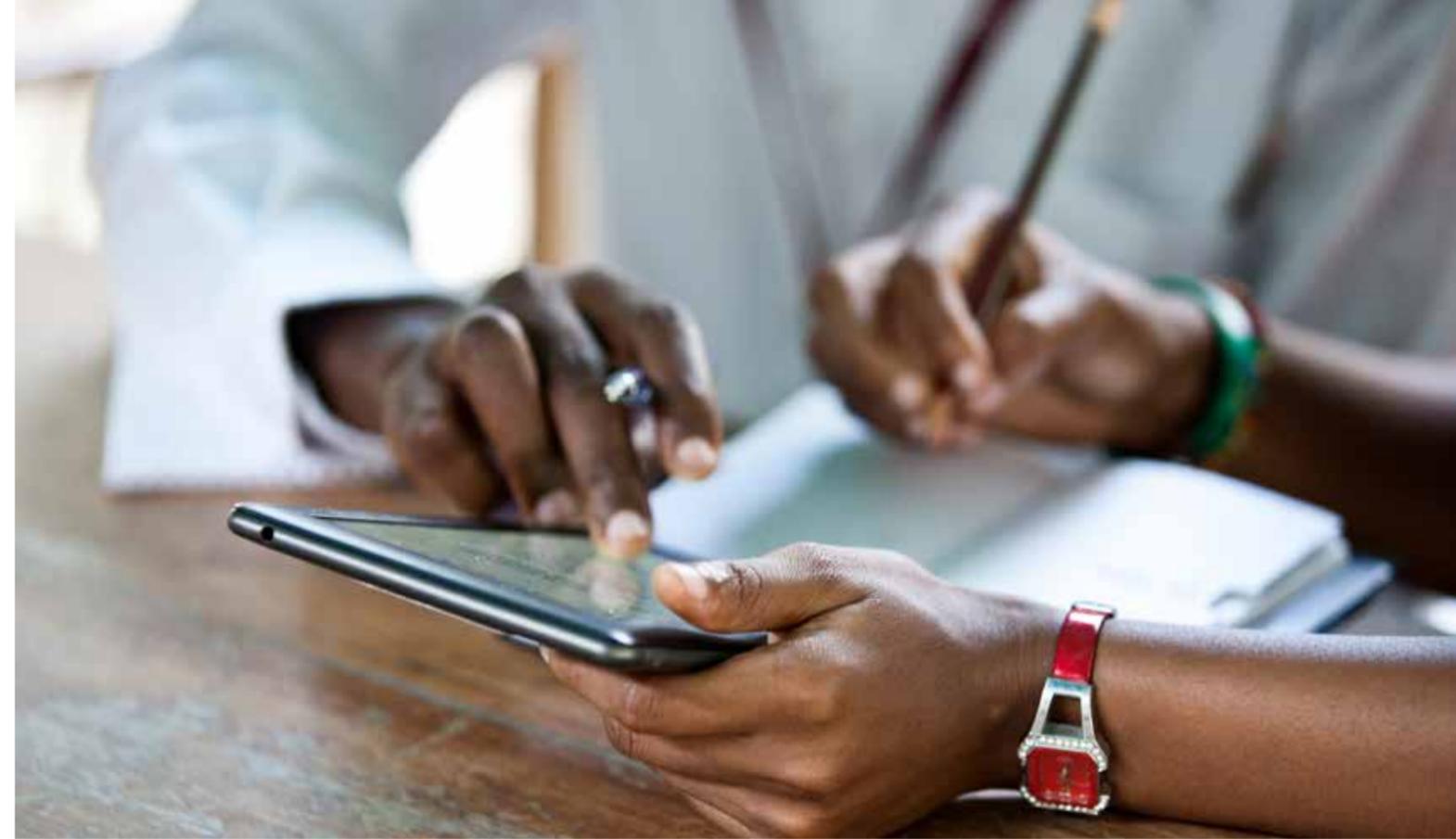
and teaching areas, the IBC will act as authorising body (functioning under University Research Council).

It would, therefore, be mandatory for researchers and teaching faculty to seek prior approval from the IBC for any work done on hazardous biological material.

The committee will develop policies and procedures to guide decisions of the IBC for conduct of research proposals involving use of biohazardous material. It will conduct sessions to raise awareness about laboratory biohazards, risk management and risk mitigation among the faculty, students, research

assistants and other lab staff of AKU. Initial courses will be run face-to-face but committee will strive to develop on-line tutorials as well.

Some of the topics include: use of personal protective equipment, blood borne pathogens, effective use of disinfectants in laboratory, working principles of biosafety cabinets, specimen shipments, IATA regulation, specimen storage and biosecurity and working in BSL-2 and BSL-3: protocols and policies. Working with associate vice provost (health sciences) and a biosafety officer / health and safety manager, the committee will ensure monitoring and compliance of safety policies at AKU.



Enhancing the grants management system

A taskforce comprising research experts has been formed to improve the efficiency of the University's extramural grant review. Indigenously customised software, PeopleSoft, is currently being used to get approval from all relevant regulatory bodies like finance, HR, legal, safety and security etc, before a grant is submitted for funding. There are, however, several limitations in the current system and the approval process often takes too long. Improvements are being introduced in this process that include, tracking the timeline of

response of regulatory departments and investigators, tracking the communication between investigators and regulatory departments, and clearly stating the timelines in which the review will be completed by different regulatory departments.

A dashboard will be made to track all the applications. Contact persons in the regulatory departments are being identified who will be responsible for timely processing of applications. Each regulatory department will produce clear guidelines about what

information should be included in the application package by the researchers. A process of urgent review will be established, where funding opportunities which have a very short turnaround time can also be pursued.

Commissioned by associate vice provost (health sciences), the associate dean (research) in Medical College, Pakistan is leading a taskforce to restructure the existing grant management system at the pre-award stage.

Formation of TISC at Research Office

The Higher Education Commission of Pakistan in collaboration with Intellectual Property Organization Pakistan and Ministry of Science & Technology recently announced the formation of Technology Innovation Support Centre (TISC).

Reporting to the associate vice provost (health sciences), TISC was established at the Aga Khan University in February, 2018 under the umbrella of the University's Research Office.

TISC has a mandate to facilitate an enabling environment to promote creation of intellectual property (IP) portfolio resulting from research conducted by the University's faculty, staff and students.

During 2018, TISC aims to conduct multiple awareness-raising sessions regarding patents and innovations in research throughout the year in efforts to familiarise AKU faculty and staff about how research can be protected and potentially commercialised. TISC

also aims to initiate collaborations with universities in Pakistan to work in areas such as digital health, biomedical, software/hardware, joint publications and joint IP/ patents. It also aims to file three patents each in Pakistan and the United States by the end of the year.

Mr Saleem Sayani, director, Aga Khan Development Network eHealth Resource Centre (Asia and Africa) has been nominated as the new director of TISC.

Introducing a dedicated space for innovation

The Innovation and Incubation Space (i2s) is the newest initiative of the Critical Creative Innovative Thinking (CCIT) forum, which is exploring ways to embed creativity and innovation in biomedicine and healthcare.

The newly launched 90-day i2s Healthcare Incubation Programme is designed to align innovation with existing gaps and inefficiencies in healthcare. Innovative ideas are evolved into applicable, and

economically viable solutions through the 90-day cycle. The i2s has established and continues to grow a multidisciplinary mentorship network spanning representation from technical healthcare fields, software development, data-science architects to successful business owners and investors. The first cohort of i2s incubates are fine tuning innovations in the medical education space – projects that they had initiated during hackathons organised by CCIT at

the University. Led by Dr Asad Iqbal Mian, associate professor & chair, emergency medicine, CCIT forum has conducted three hackathons between 2016 and 2018 and has hosted a variety of narrative medicine and ignite sessions among other initiatives to transform the conventional healthcare/ biomedical narrative. Through these activities, the CCIT has developed a framework for innovative thinking and creativity within the healthcare space at the AKU and beyond.

Research capacity building and facilitation activities by ORGS



As part of its annual programme of research capacity building and facilitation activities, the Office of Research and Graduate Studies has so far organised the following events during the current year:

Research Grant Facilitation Workshop for Faculty

The workshop was aimed at raising awareness about the Aga Khan University's policies and procedures for approval and monitoring of research grant proposals and development of research budgets. More significantly it also helped to generate a dialogue about the next steps in ensuring that grant approval and monitoring process was facilitative in nature.

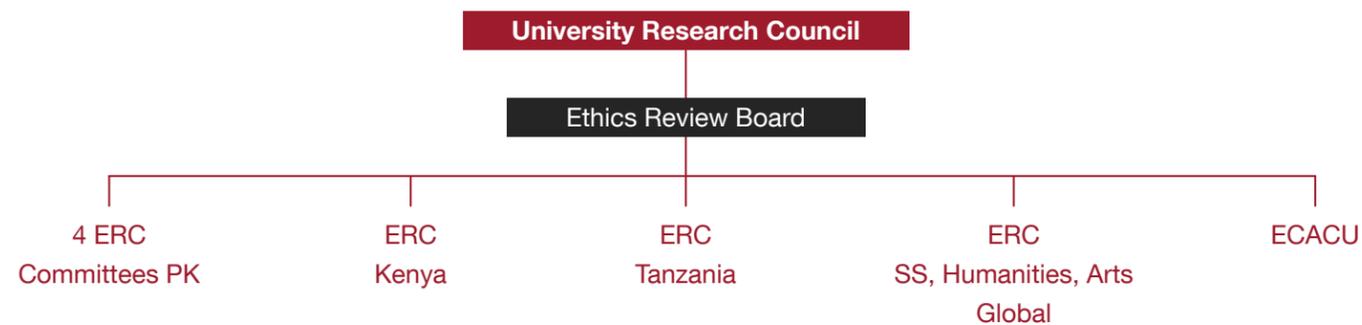
Research Management & Facilitation | Workshop for Research Administrators

The workshop was aimed at ensuring an efficient and uniform research management and facilitation system across the University. A range of teaching approaches were employed in the workshop including short presentations, interactive discussion, group work, and hands-on work.

Restructuring the ethics review system at AKU

A new and restructured ethics review system was approved by the University Research Council (URC) and endorsed by the Academic Council in its meeting on March 29, 2018. There are four main dimensions of this restructuring. First, harmonisation of ethics review policies and processes through creation of an AKU-wide Ethics Review Board (ERB). Second, devolution of the review process in Faculty of Health Sciences (FHS) through entity level Ethics Review Committees (ERCs). Third, relevance to disciplines through a separate ethics review committee for social sciences, humanities and the arts. Finally, transition to an online platform.

The new system thus introduced would be tiered as shown in the following chart:



Harmonisation: Ethics Review Board

The ERB is an AKU-wide body responsible for policy-making, governance, oversight of the ethics review process across the AKU and for hearing of appeals.

The ERB reports to the URC. The ERB has devolved the power to approve ethics clearance to the ERCs created as sub-committees of the ERB.

To ensure quality and due diligence in the review process, the ERB reserves the right to review a random selection of applications approved by the review committees.

Devolution: Ethics Review Committees

The ERCs are responsible to provide rigorous, relevant and timely review

of the applications received within the different country contexts.

They will be entitled to make decisions on the ethical review applications and all related issues directly without prior ratification of the ERB.

However, the ERB reserves the right to review and audit the functioning of ERCs as appropriate.

To take into account the heavy workload of the single ERC at AKU in Pakistan the number of ERCs in Pakistan is increased to four.

These four ERCs will review on a weekly basis the applications from FHS, Pakistan.

The number of ERCs in Kenya, Tanzania and the UK remain the same.

Disciplinary Relevance: ERC for social sciences humanities and the arts

To ensure relevance of the review to the disciplinary contexts of research applications from social sciences humanities and the arts will be reviewed by a separate committee.

This is a global committee and will review applications from the wide range of entities outside health sciences including the two institutes for educational development in Pakistan and East Africa.

Ethics clearance for students' research

For students' research at master's level and below an ad-hoc students' ethics review committee will be formed.

Doctoral students will follow the same procedure as followed by faculty and staff.

Formation of the ad-hoc committee will be undertaken by the chair ERB on the request of the coordinator/ chair/head of the respective programme as the case may be (e.g., M.Ed. programme at IEDs, master's at Medical College, School of Nursing and Midwifery).

Recognising that most student research projects are time bound and constrained by programmatic structures (e.g. field work in school term) this committee would be scheduled well ahead of time to enable students to undertake their studies within the time constraints.

Efficiency: A new online platform

AKU has subscribed to the Ethics Review Manager (<http://www.infonetica.net/erm>), which is a leading product for ethics management at national, regional and single institutions in the United Kingdom. An algorithm will be created to guide and enable applicants to submit their applications through the online platform. The algorithm and the interface would be user-friendly and guide the applicants.

This work was led by a working group chaired by Professor Anjum Halai and the members included: Dr Syed Asad Ali, Dr M Asim Beg, Dr Aamir B Lakhani, Dr Sadia Bhutta, Dr Rhonda Breit, Dr Ather Enam, Dr Eunice Ndirangu, Dr Sarah Savant, Dr Eunice Siaty, Husain Azfar and Gulshan Kalani.

Ethics Review Board

Professor Marleen Temmerman, Department of Obstetrics & Gynaecology, Kenya (Founding Chair)

Ethics Review Committee for Social Sciences Humanities and the Arts

1. Professor Stephane Pradines, Institute for the Study of Muslim Civilisations, UK (Founding Chair)
2. Dr Sadia Bhutta, Institute for Educational Development, Pakistan (Founding Member)
3. Professor Nelofer Halai, Institute for Educational Development, Pakistan (Founding Member)
4. Dr Dilshad Ashraf, Institute for Educational Development,

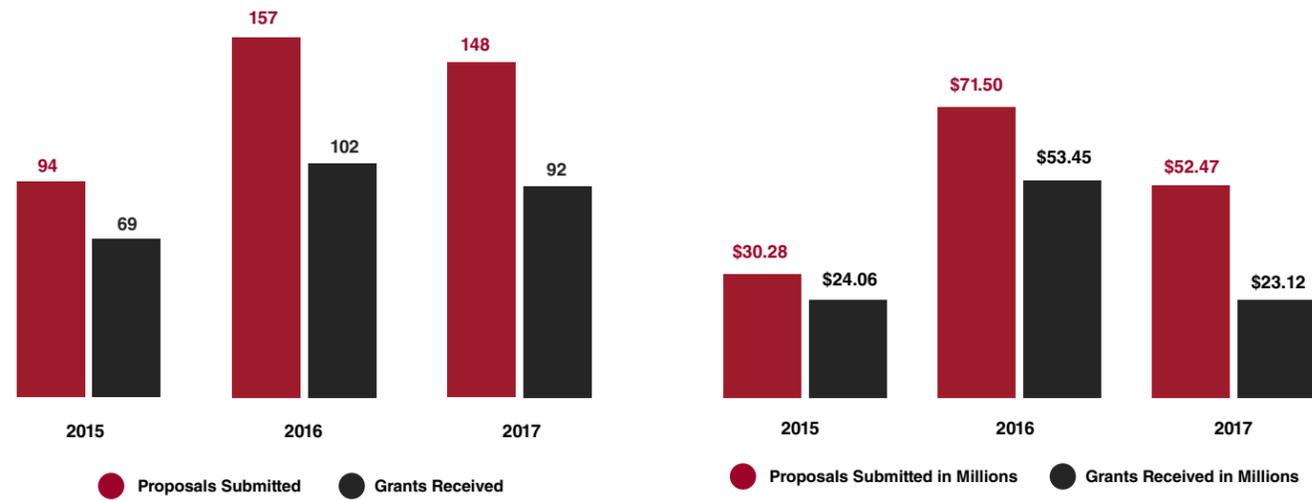
5. Dr Alex Awiti, Director, East Africa Institute (Founding Member)
6. Professor Kofi Marfo, Director, Institute for Human Development (Founding Member)
7. Professor Rhonda Breit, Graduate School of Media and Communications (Founding Member)

Ethics Review Committees for FHS

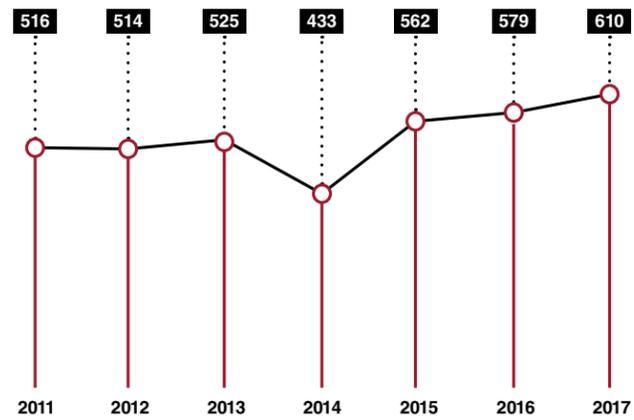
1. Chair ERC-PK I –Dr Marie Andrades, Associate Professor, Department of Family Medicine, Medical College, Pakistan
2. Chair ERC-PK II –Dr Khabir Ahmed, Associate Professor, Department of Surgery, Medical College, Pakistan
3. Chair ERC-PK III –Dr Fyezah Jehan, Assistant Professor, Department of Paediatrics & Child Health, Medical College, Pakistan
4. Chair ERC-PK IV –Dr Jamsheer Jehangir Talati, Professor, Department of Surgery, Medical College, Pakistan
5. Chair ERC-Kenya –Dr Aamir B Lakhani, Assistant Professor, Department of Family Medicine, Medical College, East Africa
6. Chair ERC-Tanzania – Professor Joe Lugalla, Director, Institute for Educational Development, East Africa
7. Chair Ethics Committee for Animal Care & Use –Dr Tashfeen Ahmad, Assistant Professor, Department of Surgery, Medical College, Pakistan

Senior Manager, Ethics and Integrity
Dr Misbah Mannan

Grants* at a glance



AKU publications in peer-reviewed journals**



* Extramural grants
** Articles published with AKU as first author





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