



تجمع الرياض الصحي الثاني
Riyadh Second Health Cluster
شركة الصحة القابضة

RESEARCH CENTER

ANNUAL REPORT

2024



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INTRODUCTION

Welcome to the Research Center 2024 Annual Report, a cornerstone of the Riyadh Second Health Cluster (R2). As an integral part of R2's mission to elevate healthcare services and advance research, our center remains dedicated to driving meaningful change in patient care and public health.

Grounded in scientific inquiry and motivated by a commitment to improving patient outcomes, we work with healthcare professionals and researchers to address some of the most pressing healthcare challenges. Through a robust portfolio of innovative research projects and strategic partnerships, we aim to translate scientific insights into practical solutions that make a tangible difference in the lives of patients and communities across the region.

In 2024, we have made significant strides in advancing healthcare excellence. Our research efforts have led to groundbreaking discoveries, while our national and international collaborations have fostered the exchange of knowledge and expertise. This report provides a comprehensive overview of key achievements, challenges, and the invaluable lessons learned throughout the year.

As we reflect on our journey, we celebrate the progress we have made, while looking ahead to the future. Our continued commitment to innovation, collaboration, and patient-centered care will guide us as we work toward even greater accomplishments in the years to come.

We invite you to join us in exploring the highlights of 2024, and together, let's envision a healthier, brighter future for the communities we serve.

MESSAGE FROM THE VICE PRESIDENT OF RIYADH SECOND HEALTH CLUSTER



We are extremely proud that the Research Center has continued to succeed in providing a conducive research environment. Besides facilitating the funding of scientific merit research projects, the center provides efficient support services and innovative educational activities while ensuring compliance with the highest research conduct standards since its inception. Thus, the Research Center is committed to its mission of spreading research culture and achieving research excellence to improve the healthcare system.

At the R2 Research Center, we have developed clear strategic plans based on the 2030 Saudi Ministry of Health's Vision. Given the increased understanding of aligning research with the Saudi healthcare system, we have a critical responsibility to expand research capability across different divisions. The Research Center is dedicated to meeting its immediate needs and fostering research in all cluster II healthcare entities. Throughout this annual report, you will find the top-notch achievements of the Research Center highlighted by each administration. This report will also present Research Center staff and available services and resources. Finally, I am thankful Research Center staff for taking on these responsibilities and understanding the Research Center vision. My sincere gratitude also goes to all of our researchers for their exceptional hard work, and I want to grab this opportunity to encourage them to keep their faith in research for a better future in health care.

Dr. Dania H. Al-Jaroudi

Vice President, Riyadh Second Health Cluster, Research Center
Executive Director, King Fahad Medical City, Research Center

RIYADH SECOND HEALTH CLUSTER

VISION

Advancing care to elevate health and well-being for all.

MISSION

Deliver an innovative and sustainable model of care for a better quality of life for all.

RESEARCH CENTER

FIVE-YEARS STRATEGIC PLAN

- 1. Establishment of Medical and Scientific Journal:** The Research Center spearheads and supports a wide array of high-caliber research initiatives that warrant knowledge dissemination of their findings through the establishment of a medical journal. This journal would align with our ongoing efforts to foster a dynamic research ecosystem that underscores the productivity of R2 clinical, biomedical, and translational research. Additionally, the journal will chart the course for future investigations aimed at enhancing healthcare services and establishing the Research Center as a leading entity in the field. It will be a multidisciplinary, peer-reviewed, open-access publication, encompassing all medical specialties and proudly published by the Research Center.

Lunching the Journal of Medicine, Law & Public Health (ISSN Print 2788-9815, ISSN Online 2788-791X). The journal can be accessed through: <https://www.jmlph.net/index.php/jmlph/about>.

JM L&P HEALTH
The Journal of Medicine, Law & Public Health

Register Login

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ABOUT SUBMISSIONS POLICIES ISSUES INDEXATIONS ANNOUNCEMENTS SEARCH

JM L&P HEALTH
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Riyadh Second Health Cluster
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Open Access, No Processing Fees
"Knowledge for All - Freely Accessible"

MAKE A SUBMISSION

PUBLICATION FREQUENCY:
Quarterly
ISSN (P): 2788-9815
ISSN (E): 2788-791X
REVIEW TYPE: Double-blind Peer-review
JOURNAL TYPE: Open Access
AREA OF PUBLICATION: Medicine, Public health and Medical law/ethics
ACCEPTANCE RATE: 55%

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2. Research education and training program: Knowledge Management and Research Excellence are central to advancing the R2 strategy for enhancing research capacity. In this context, the Research Center has established a comprehensive education and training program for healthcare providers (HCPs), aimed at equipping them with the essential skills and knowledge needed to conduct scientific research. By improving HCPs' knowledge, attitudes, and practical experience, this initiative will ultimately drive an increase in the volume of indexed research publications, foster a rigorous research culture, and strengthen the KFMC research bran.

3. Automation of Research Services and IRB Submission: The current process for requesting Research Center services—such as funding, scientific writing, and outsourcing—along with IRB submission services, relies on traditional communication methods, including emails and paperwork. Given the increasing demand for these services, there is a pressing need to optimize these processes to better meet the needs of researchers and enhance their overall experience and satisfaction.

The automation of Research Services and IRB Submission will leverage technology to streamline the utilization of existing services and reduce turnaround times. The proposed software will incorporate features that:

- Enable researchers to request and track Research Center services (funding, scientific writing, outsourcing) more efficiently.
- Simplify the creation and submission of research proposals and protocols, manage the IRB review process, and facilitate seamless communication with study members throughout.

RESEARCH CENTER STRATEGY MAP

Perspective	Strategic Objectives		
Customer/ Stakeholders	Enhance KFMC Research Brand	Improve Stakeholders Experience & Satisfaction	
Financial	Optimize Revenue Cycle Management	Maximize Utilization of Research Resources	
Internal processes	Improve Performance Management	Improve Quality of Research Services	
	Promote Good Governance & Regulation	Enhance Effective Communication & Knowledge Sharing	
Organization Capacity	Build Researchers Capacity	Promote Research Environment and Culture	Maximize use of Technology & Digitalization
	Maximize KFMC Research Output	Optimize Research Education & Training	Invest in Leadership Development

RESEARCH CENTER SERVICES

The Research Center supports R2 staff by providing the following services

I. Research Education and Awareness (Workshops and Courses):

- **Annual educational and training calendar** featuring lectures and workshops designed to reinforce the research culture and enhance research skills across various disciplines.
- **Outreach educational program** delivering on-site, practical research lectures for residents, fellows, nurses, and other healthcare staff. Each program is customized to meet the specific needs of different hospitals, centers, and administrative structures.
- **Annual Research Symposium** to showcase progress and success stories from ongoing research projects, while fostering a collaborative networking environment for researchers to share insights and build connections.
- **Research Awareness campaigns** aimed at engaging R2 staff, enhancing their knowledge, attitudes, and active participation in research initiatives.

II. Research Conduct Support

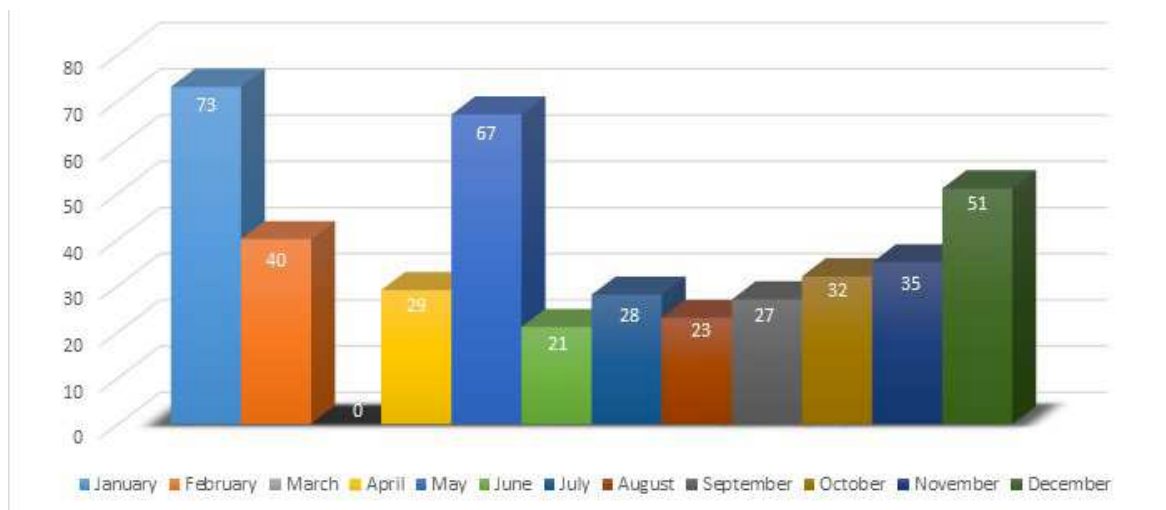
- **Provide comprehensive support for industry-sponsored clinical trials**, ensuring efficient coordination, regulatory compliance, and optimal resource allocation.
- **Facilitate and support investigator-initiated clinical trials**, offering guidance, infrastructure, and resources to enhance the quality and impact of independent research efforts.

III. Translational Research Support

- **Offer comprehensive environmental support and state-of-the-art laboratory facilities** to facilitate the successful conduct of translational research.
- **Strengthen translational research skills** by providing targeted training courses and workshops designed to enhance expertise and practical knowledge in this field.
- **Provide essential services for the management of biological specimens**, including efficient collection, processing, and long-term storage through a dedicated biobank.

IV. One-to-one research consultation services

- **Offer expert consultation services** in the development of research ideas, proposal writing, study design, statistical analysis, methodology, and manuscript preparation, thereby empowering researchers to navigate the path to publication successfully .



One-to-one research consultation services 2024.

V. Research Financial Support (Intramural Research Fund-IRF)

- **Offer competitive financial support** to researchers at King Fahad Medical City and R2, enabling them to conduct high-quality research by providing the necessary funding for their projects.

VI. Researchers' Recognition

- Best research award
- Publications incentives
- Annual Research Conference

19TH ANNUAL RESEARCH CONFERENCE 24-26TH DECEMBER 2024

The Annual Research Conference aims to bring together a convergence of brilliant minds, innovative ideas, and groundbreaking advancements in the realm of clinical and translational research. This activity aims to share our latest findings, engage in fruitful discussions, and chart the course for the future of medical research from a multi-disciplinary group of physicians, scientists, and allied health professionals from KFMC, Riyadh's 2nd Health Cluster, and all over the Kingdom to present and exchange breakthrough ideas and findings relating to translational clinical research.

As part of Riyadh Second Health Cluster Research Center mission to provide value-based healthcare services empowered by innovation and research the conference featured preconference workshops, discussion panels, oral presentations, and poster sessions. Our conference hosted scientifically rich sessions, workshops, and poster presentations. These avenues of exploration allowed participants to explore deep into the complexities of translating fundamental scientific knowledge into tangible clinical applications, each facet of active discussions will eventually contribute to the mosaic of progress in translational medicine.

KEYNOTE SPEAKERS

The 19th Annual Research Conference featured distinguished invited keynote speakers who brought great expertise, insights, and inspiration to the diverse gathering of researchers, physicians, scientists, and professionals. They shared their expertise through discussion panel and presentations which served as crucial points for the conference, setting the tone for engaging discussions and providing valuable perspectives on contemporary challenges and opportunities within various fields.



Discussion Panel

Kingdom of Saudi Arabia Leap in clinical and Scientific Research; Towards 2030 and Beyond.

Session Chairperson, Dr. Dayel Al Shahrani



Dr. Ahmad Al Bader

The former Executive
Director of the Research
Centre at KFMC in Riyadh



Dr. Batoul Al Baz

Vice-President Health Sector
at King Abdulaziz City for
Science and Technology



Dr. Sultan Al Saudary

Research Scientist, Executive
Administrator, KFSH&RC



Prof. Yazeed Al Alsheikh

President of King Saud University for
research and graduate studies

DISCUSSION POINTS

- Past experiences in the research process and lessons learned.
- Researchers in the Kingdom, where do we stand?
- How to support academic and clinical research.
- Research and innovation priorities under Vision 2030 and beyond.
- Current challenges, and how to overcome them.

KEYNOTE SPEAKERS

Keynote Speakers



Prof. Khalid Al Rubeean

- A Full Professor of Endocrinology and Internal Medicine
- Director of Research and Scientific Center at Sultan Bin Abdulaziz Humanitarian City.
- A Part-time WHO consultant at Regional Office for the Eastern Mediterranean region (EMRO)
- The chairman of board of trustee and founder of Diabetes Science International Foundation, Basal, Switzerland.
- Editor-in-Chief for International Journal of Diabetes Mellitus and Al-Sukhari Magazines



Dr. Rasha Alfawaz

- Director of Public Health Programs and policies at the Gulf Center For Disease Prevention and Control.
- A former Chief Officer for Health Improvement and Promotion at the Saudi Public Health Authority.
- Director of Non-Communicable Disease affairs.
- Headed the Support and Development Unit at the General Directorate of Health.
- Programs and Chronic Diseases, and the Director of Diet and Physical Activity National Program.



Prof. Wadee Alhalabi

- Professor, King Abdulaziz University.
- Prof. Alhalabi's expertise covers issues in virtual reality, rehabilitation engineering, and the use of virtual reality application in health science.
- Authored, Edited and co-edited as well as reviewed large number of books, articles, and journals.
- A vast experience in the industry, as he worked for Jeddah desalination and power generation plant, Saudi Arabia Monetary Agency, Makkah College of Tech., and King Abdulaziz University.

WORKSHOPS

The conference hosted two workshops designed to provide attendees with hands-on experiences, practical skills, and in-depth knowledge of research methodologies, tools. These workshops were facilitated by recognized experts and covered various topics in Questioner design for clinical research and Research integrity.

Workshop Topic	Time	Location	Moderator	Speakers	Titles
Questionnaire Design Workshop	Morning 10:00 AM - 01:00 PM	Mohammad Bin Abdulaziz Hospital	Dr. Raghda Al-Farhan		- Research quality in health and social science surveys. - Validity and reliability in a questionnaire. - Open ended Vs closed ended questions/ Qualitative Vs Quantitative Data. - How to use qualitative data and mixed method in a questionnaire Survey. - How to measure attitudes & use Lickert Scale.
Academic Research Integrity	Afternoon 1:00 PM- 3:00 PM		Dr. Mona Alanazi	Dr. Muaawia Ahmed Hamza Amani AbuShaheen	Academic integrity at the age of AI Predatory Publications

CONFERENCE IMPORTANT NUMBERS

ABSTRACT SUBMISSION

A total of 109 abstracts were received from different health and educational institutions across the Kingdom. The Research center at R2 serves different scientific and clinical interests, resulting in various specialties and projects that cover over 100 scientific and healthcare topics. This diversity of topics attracted Over 300 attendees with different professional expertise. Below are the numbers that reflect that.

ORAL PRESENTATIONS

A total of 22 oral presentations (see program below)

The heart of the conference lay in the oral presentations, where researchers could showcase their studies, methodologies, and results to a broad audience. Presenters demonstrated a high level of expertise, and lively discussions followed each session, encouraging knowledge exchange and the exploration of potential collaborations. Topics varied from pure clinical research and scientific materials to more specialized areas in physics and artificial intelligence, but all shared the same focus on clinical and healthcare research. A professional evaluation by the assigned conferece jury panel selected 3 winners from the oral presentations.



Conference Program Day 1 (December 25, 2024)

Day 1		Wednesday, 25 December, 2024	
From	To	Topics	Speakers
8:15	8:40	Registration	
Session 1: Translational Virology Research Session Chairperson (Dr. Sharafaldeen Bin Nafisah)			
8:45	9:00	Humoral and Cellular Immune Durability of Different COVID-19 Vaccine Platforms Following Homologous/Heterologous Boosters: One-Year Post Vaccination	Dr. Maaweeya Elaeed Hamed Awad Alla
9:00	9:15	A 10 year long-lived cellular and humoral MERS-CoV immunity cross-recognizing the Wild-type and Variants of SARS-CoV-2	Dr. Bandar Alosaimi
9:15	10:15	Opening Ceremony discussion panel & Welcome Remarks , Kingdom of Saudi Arabia Leap in clinical and Scientific Research; Towards 2030 and Beyond. (Session Chairperson, Dr. Dayel Alshahrani)	Dr.Yazeed Al Alsheikh , Dr. Sultan Al Saudary , Dr. Ahmad Al Bader, & Dr. Batoul Al Baz.
10:15	10:45	Networking Coffee Break	
Session 2: Genetic Research and disease management, Session Chairperson (Dr. Leen Abo Safieh)			
10:45	11:00	Three-year experience in genetic screening and prevention of primary congenital glaucoma (PCG) in Saudi Arabia: early results from a pilot program at King Khaled Eye Specialist Hospital (KKESH).	Dr. Manal Alwazae
11:00	11:15	Genetic screening and counselling for families with Primary Congenital Glaucoma (PCG): Three years of experience at King Khaled Eye Specialist Hospital (KKESH) in Saudi Arabia.	Dr. Areej Alizary
11:15	11:30	Dual Activation of TMEM16A and TRPV4 by Eact as Potential Therapeutic Target for Cystic Fibrosis	Dr. Razan Orfali
11:30	11:45	A novel homozygous splice site variant in the CLCN7 causes Osteopetrosis	Dr. Zeinab Mohamed Klaab
11:45	12:15	Posters viewing and Networking	
12:15	13:30	Prayer and Lunch Break	
Session 3: New Frontiers and Technologies in Clinical Research Session Chairperson (Dr. Bandar Alosaimi)			
13:30	13:45	The Outcome of Intra-Operative Chest Tube Insertion in Esophageal Atresia Patients	Dr. Yasir Alrashdan
13:45	14:00	'Transanal Endorectal Pull-through vs Duhamel Surgery in The Management of Hirschsprung Disease: A Retrospective Study'	Dr. Mohammad Abdulatef Halawani
14:00	14:15	Hybrid Mathieu Urethroplasty vs.Tubularized Incised Plate Urethroplasty for the Management of Distal Penile Hypospadias With a Small Glans	Dr. Mohammad Gharieb Khirallah
14:15	14:45	Efficacy and cost-effectiveness of 3D Printed Assistive devices for rehabilitation hospital beneficiaries	Dr. Walaa Alammar
14:45	15:00	Peri-Kasai portoenterostomy sutures anchoring the jejunal loop to Glisson capsule: A novel modification to reduce the incidence of cholangitis	Dr. Mohammad Gharieb Khirallah
15:00	15:15	Posters Viewing and Networking	
15:15	15:30	1 st Day Closing Remarks	

Conference Program Day 2 (December 26, 2024)

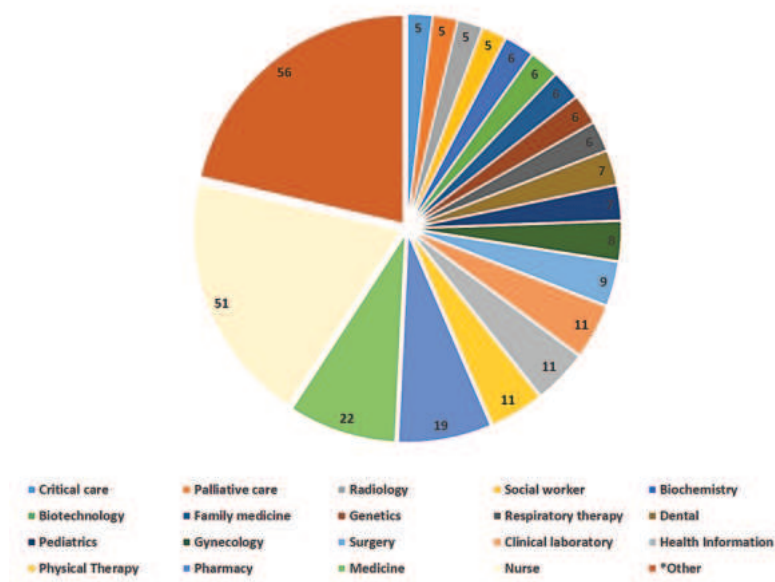
Day 2		Thursday , 26 December, 2024	
From	To	Topics	Speakers
8:30	9:00	Registration	
Session 1: Health and Wellbeing Research - part 1 Session Chairperson (Dr. Saleh Alrajhi)			
9:00	9:30	Hakuna Matata between Old & New Medicine	Prof. Khalid Al Rubeaan <i>Keynote Speaker</i>
9:30	9:45	Changes in consummatory behavior (liking) after liraglutide treatment in adult people with obesity	Dr. Najla Alorayyidh
9:45	10:00	Efficacy of Arabic Carbohydrate Counting /Bolus Calculator Mobile Application on Glycaemia Control among Type 1 diabetes subjects	Dr. Sara Albabtain
10:00	10:15	Investigation of the Effects of Support Matrices on the Structure and Folding of G6PD Enzymes from G6PD-deficient Patients	Dr. Muawiyah Ahmad H. Ahmed
10:15	10:45	Networking Coffee Break	
Session 2: Health and Wellbeing Research - part 2 Session Chairperson (Prof. Naji AlJohani)			
10:45	11:00	Evaluation of Treatment Parameters for Focused-Extracorporeal Shockwave Therapy in Knee Osteoarthritis Related Bone Marrow Lesion	Dr. Hani Alabbad
11:00	11:30	Public Health Programs and Policies, towards better health care	Dr. Rasha Al Fawaz <i>Keynote Speaker</i>
11:30	11:45	Calcium versus cabergoline for prevention of ovarian hyperstimulation syndrome: a systematic review and meta-analysis.	Dr. Saeed Marzoq Baradwan
11:45	12:00	Depressive Symptoms and Burden Among Caregiver of Adult Cancer Patients at KFMC, Riyadh, Saudi Arabia	Dr. Razan Ahmad Aljudibi
12:00	12:30	Posters viewing and Networking	
12:30	13:30	Prayer and Lunch Break	
Session 3: AI & Clinical Research, Gynecology Research Session Chairperson (Dr. Ali AlFaiz)			
13:30	14:00	Innovation AI Application in Clinical Research	Prof. Wadee Alhalbi <i>Keynote Speaker</i>
14:00	14:15	A Rare Case of Herpes Simplex Meningoencephalitis and Seronegative Cerebral Toxoplasmosis Co-Infection in a Pregnant Saudi Woman	Dr. Razan Almasuood
14:15	14:30	Live Births After Vaginal Progesterone Cyclogest Suppository Versus Crinone Gel for Luteal Phase Support (LPS)	Dr. Dania Aljaroudi
14:30	14:45	Effect of mixed gonadotropins on pregnancy rate in comparison to mono gonadotropin in antagonist protocol ICSI cycles' stimulation	Dr. Hind Aldabal
14:45	15:00	Pap smear screening combined with human papillomavirus (HPV) test in subfertile women	Dr. Ahmed Saleh
15:00	15:15	3D fibrin co-culture of human monocytes and mesenchymal stem/stromal cells induces a prorepair phenotype that enhances chondrogenesis	Dr. Mohammad Nasser Alkhrayef
15:15	15:30	Awarding Ceremony and Conference Closing Remarks	Dr. Leen Abu Safieh

POSTER PRESENTATIONS

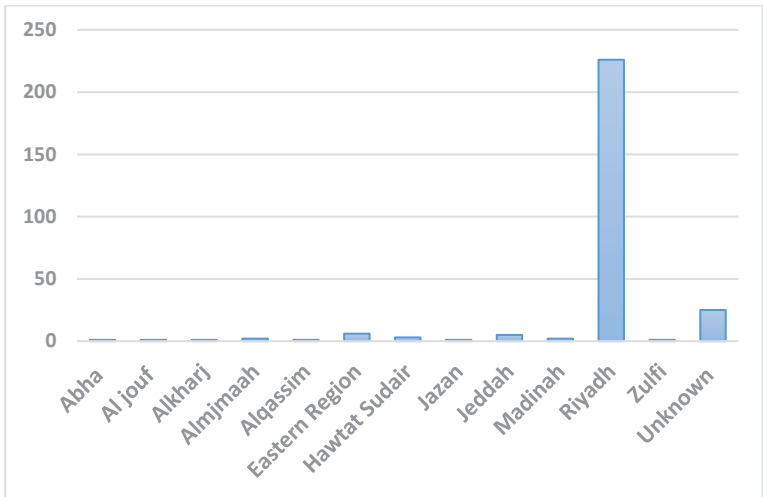
A total of 87 posters were accepted and displayed during the two day of the conference on interactive screens. The poster sessions provided a platform for researchers to visually communicate their work and engage in one-on-one discussions with conference attendees. The poster presentations covered various research topics, allowing participants to gain insights into emerging trends and novel approaches within various disciplines. Attendees appreciated the interactive nature of the poster sessions, as they facilitated in-depth conversations and networking opportunities. A professional evaluation by the assigned conferece jury panel selected 5 winners from the poster presentations.

REGISTRATION INFORMATION

Online registration was open in August 2024. Onsite registration was also available during the conference.



Percentage of participants over 54 specialties.



Numbers of conference registrations by city.

AWARDS

The 19th Annual Research Conference was a tremendous success, bringing together a varied community of scholars and professionals to share knowledge, explore ideas, and make connections. The seminars, oral presentations, and poster sessions all contributed to the conference's lively environment and provided useful insights into the most recent breakthroughs in diverse sectors. As the academic community grows, conferences like these are critical to furthering knowledge and promoting collaboration. The conference highlighted outstanding research and announced the winners in many categories. The following researchers were awarded for their distinguished contributions to the conference

Table 1: Poster winners (Names arranged in alphabetical order)

Researcher Name	Title
Alanoud K. Alsaffi	Effectiveness of Online Training Approach on Intervention for In-Hospital Stroke Codes in Saudi Arabia on the Knowledge of Emergency Nurses
Abdullah Alenazi	Evolutionary analysis of LMP-1 genetic diversity in EBV-associated nasopharyngeal carcinoma: Bioinformatic insights into oncogenic potential
Abeer M. Alshedoukhi	Measuring the Effect of Clinical Workflows on the Quality and Safety of Nurses' Practice During the Transition from a Paper-based to Electronic-based Documentation: An Exploratory Study
Hanadi A. Fatani	Intrathyroidal metastatic carcinoma from the breast
Dr. Saeed Bardwan	CO2 laser therapy for management of stress urinary incontinence in women: a systematic review and meta-analysis

Table 2: Oral presentation winners

Award Category	Researcher Name	Title
1st Rank	Dr. Hani M. AlAbbad	Evaluation Of Treatment Parameters for Focused-Extracorporeal Shock Wave Therapy in Knee Osteoarthritis Patients with Bone Marrow Lesions
2nd Rank	Dr. Saeed Bardwan	Calcium versus cabergoline for prevention of ovarian hyperstimulation syndrome: a systematic review and meta-analysis
2nd Rank	Dr. Najla Turki Alorayyidh	Changes in consummatory behavior (liking) after liraglutide

Conference committee's members

Dr. Adnan Al Maghlouth- President of the conference

Organizing Committee

Dr. Leen Abu Safieh: Chairperson

Members

Dr. Mohammad Jazzar

Ms. Maram Alshammari

Dr. Razan Orfali

Mr. Abdulaziz Al Saloom

Scientific Committee

Dr. Saleh Alrajhi: Chairperson

Dr. Mohammad Jazzar

Mr. Saad AlAmri

Dr. Maaweya Awad Allah

CONFERENCE PHOTO GALLERY

IMAGES FROM THE OPENING CEREMONY



Random Images from the Oral Presentations



Random Images from Poster sessions and conference
discussions and networking



Closing Ceremony Group Picture

CONGENITAL AND INHERITED DISABILITY DISORDERS SYMPOSIUM 10-11TH NOV 2024

تجمع الرياض الصحي الثاني
Riyadh Second Health Cluster
شركة الصحة الثانية

The Biomedical Research Administration- Research Center at Riyadh 2nd Health Cluster invites you to attend:

Congenital and Inherited Disability Disorders (CIDD) Symposium

Faculty of Medicine Auditorium- KFMC
Riyadh, Kingdom of Saudi Arabia

9:00 to 15:00 | 10th Nov 2024 | registration (Free).

Symposium Highlights:

- Attend an interesting scientific program.
- Meet distinguished speakers in the field of genetics and inherited disability diseases.
- Learn about the latest technologies used for genetic diagnosis, management and research.

This is a unique opportunity to bring together genetic experts, scientists, clinicians, researchers, practitioners and other healthcare professionals.

For information, please contact:
Continuous Professional Development Administration
E-mail: CPD@KFMC.MED.SA
Ext. 10943, 10944, 10946.
For inquiries, please contact:
E-mail: AIACCC@KFMC.MED.SA
Tel. No.: 8001277000

ACCME ACCREDITED

The King Fahad Medical City is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

AFMS

Cluster2_Riyadh | 8001277000 | إنتاج التواصل المؤسسي والتعبير

For the first time the biomedical research department organized the Disability and Inherited disorders symposium held at KFMC-Faculty of Medicine building- Main Auditorium. During this activity the symposium hosted clinicians, scientist, and counselors who have been working in this field for over 20 years, and founders of so many clinical and research based genetic programs in Saudi Arabia. Speakers with distinguished discoveries and publications who won multiple awards for their findings.

The two days' program contained fifteen specialized presentations in the field of inherited disability disorders focused on Hearing Loss, Vision impairment, Inherited neuro and motor diseases, Inherited intellectual disability diseases and Chronic diseases (see program below). Registration was open on the 1st of November and over 400 participants registered for the symposium.

Symposium coordinators

- . Ms Maram S. Alshammari
- . Mrs Hadel Alsaran
- . Mr Saad Al Amre

Symposium Director

- . Dr. Leen Abu Safieh

SCIENTIFIC PROGRAM

Day 1 - 10th November 2024

Time	Speaker	Title
9:00 -9:15 am	Registration and networking	
9:15- 9:20 am	Opening ceremony	
Session 1: Genetic Diseases in the Saudi population Moderator: Dr. Dayel Al Shahrani		
9:20 -9:50 am	Dr. Naif Almontashiri	Dr. Naif -Lessons Learned and Knowledge Gained from SUNRISE study: Solving Undiagnosed Rare Genetic Diseases In Saudi Ethnicity
9:50-10:20 am	Dr. Amal Alhashim	Inherited Disabilities and Digital Medicine: The Role of Virtual Genetic Services (Via Zoom)
10:20-10:50 am	Dr. Manar Al Samman	Translating Genomics: Bridging the Lab and the Clinic
10:50-11:15 am	Networking Tea/Coffee break	
Session 2: New technologies and future prevention of genetic diseases Moderator: Dr. Naser Al Amin		
11:15-11:45 am	Dr. Faiqa Ahmed	Progress, Pitfalls, and the Future of Prenatal Genetic Diagnosis at KFSH&RC.
11:45-12:15 pm	Dr. Wafa Qubbaj	Current Practice and updates in preimplantation genetic testing (PGT)
12:15-12:45 pm	Dr. Ali Al Hassan	Transforming drug development with deep technology; nanotechnology, artificial intelligence, and machine learning
12:45 -1:30pm	Prayer/ Lunch break	
Session 3: Handling genetic diseases Moderator: Dr. Asim Khogeer		
1:30 -2:00 pm	Ms.Haya Al-Dossari	Challenges in Interpreting Genetic Results: The Evolving Role of the Genetic Counselor in the Lab
2:00-2:30 pm	Dr. Alya Qari	The Role of Genetic Counseling in Supporting families with Disabilities: A Comprehensive Approach
2:30-3:00 pm	Dr. Nawel Trabelsi	Precision Unlocked; the impact of Digital PCR on genetic disorders
3:00-3:30 pm	Dr. Abdulali Pirzada	Digital PCR in Molecular diagnostics
End of first Day		

Day 2 - 11th November 2024

Time	Speaker	Title
Session 3: Saudi Experience with Genetic diseases causing disability		
Moderator: Dr. Adnan Al Maghlouth		
9:15 - 9:45 am	Dr. Faiqa Ahmed	Deafness Overview in Saudi Arabia
9:45-10:15 am	Dr. Saba Al Rashed	HRD. (Phantom of blindness)
10:15 -10:30 am	Networking Tea/Coffee break	
10:30-11:00 am	Dr. Eissa Faqqeh	Inherited Intellectual disabilities in KSA
11:00-11:30 am	Dr. Saleh Alrajhi	Epigenetic modifications influenced by lifestyle choices
11:30-12:00 pm	Prof. Meteb Altaf	KACST efforts in Disability Research
10:15 -10:30 am	Closing Remarks	

Symposium Gallery



SOCIAL RESPONSIBILITY

As part of its social responsibility, the Research Center actively recruits fresh graduates as trainees and volunteers:

- Trainees are selected in collaboration with Academic and Training Affairs from various institutions, providing opportunities for recent graduates to gain hands-on experience in research.
- Volunteers are engaged through a partnership with Public Relations via the Health Volunteering Platform, offering individuals the chance to contribute to research initiatives and gain valuable exposure in the field.

QUALITY AND KAIZEN PROJECTS

- Digitalization of research center key performance indicators (KPIs).
- Intellectual Property (IP) Awareness and Screening.
- Towards High Impact Translational Research (Bench-to-bedside research).

AWARDS

- Nomination for Geneva International Exhibition of Inventions 2025

COMMITTEES, MEMBERSHIPS, AND TASK FORMATION ORDERS (TFO)

COMMITTEES

- KFMC Central Research Committee
- R2 Central Research Committee
- Translational Research and Precision Medicine Advisory Committee
- Research Center Quality Improvement Committee
- Publication Incentives Committee
- Intramural Research Fund Committee
- Annual Research Conference Committee
- Research Center Risk Management Subcommittee
- Research Center Accreditation Subcommittee

TASK FORMATION ORDERS

- Drug Discovery and Targeted Therapy
- Research Integrity Management
- Research Center Volunteers and Trainees Management
- Biomedical Research Administration and Pathology
- and Clinical Laboratory Medicine Administration EPIC-
- Research Center Team
- Research Center Recruitment Team
- Biobank



MEMBERSHIPS

- European Network for Academic Integrity
- American society of human genetics
- Association for Research in Vision and Ophthalmology
- Biophysical Society
- Virology Research Group
- Anatomy Research Group
- Oncology Research Group
- Biomedical Research Group

KFMC RESEARCH COMMITTEES

- Pathology and Clinical Laboratory Medicine Administration Research Committee
- Pharmacy Services Administration Research Committee
- Medical Imaging Administration Research Committee
- Main Hospital Research Committee
- Children Hospital Research Committee
- Rehabilitation Hospital Research Committee
- Women's Specialized Hospital Research Committee
- Obesity, Endocrine & Metabolism Center Research Committee
- King Salman Heart Center Research Committee
- National Neuroscience Institute Research Committee
- Comprehensive Cancer Center Research Committee
- Nursing Affairs Research Committee
- Dentistry Department of Research Committee
- Medical Ancillary Services Research Committee
- Engineering Research Committee
- Critical Care Unit Research Committee
- Emergency Medicine Research Committee
- Infection Control Administration Research Committee
- Anesthesiology Department Research Committee
- Faculty of Medicine Research Committee

R2 RESEARCH COMMITTEES

- Prince Mohammed Bin Abdulaziz Hospital Research Committee
- Al-Yamamah Hospital Research Committee
- Dental Center Research Committee
- Primary Health care centers Research Committee
- Al Zulfi General Hospital Research Committee
- King Khaled Hospital Research Committee
- Al Artawiyah General Hospital Research Committee
- Rumah General Hospital Research Committee
- Tamir General Hospital Research Committee
- Al-Ghaat General Hospital Research Committee
- Hawtat Sudair Hospital Research Committee
- King Salman Center for Kidney Diseases Research Committee

KFMC CORPORATE POLICIES AND PROCEDURES

To effectively disseminate the research regulations among KFMC staff and adopt a unified approach to the roles and responsibilities of the Research Center.

▪ **Coverage of Publication and Editing Charges (CPP No. 1432-174)**

This policy supports article processing and editing fees for publications in journals indexed in the following databases: JCR, Medline, PubMed, EMBASE, SCOPUS, and open-access journals.

▪ **Sponsor-Initiated Research (CPP No. 1432-31)**

This policy outlines the requirements for industry-sponsored research, including laboratory studies, clinical trials, device evaluation, and observational studies. This policy applies to both investigator-initiated and sponsor-initiated research.

▪ **Intramural Research Fund (CPP No. 1433-07)**

This policy describes the R2 Intramural Research Fund (IRF), which was created to provide financial research support to R2 staff, according to their merit, to enhance R2's research productivity.

▪ **KFMC Authorship (CPP No. 1432-160)**

This policy defines the mechanism of publication authorship that is followed by R2 as per international regulations.

▪ **Outsourcing Research Services (CPP No. 1435-25)**

This policy streamlines the process of outsourcing biostatistics, and scientific writing and editing services, to cover shortages of skills or expertise in these fields.

▪ **Plagiarism in Clinical Research (CPP No. 1433-09)**

This policy ensures compliance with national and international regulations concerning plagiarism and research intellectual property.

- **Research-Protected Time (CPP No. 1436-30)**

This policy streamlines the process of protected time for eligible R2 staff to conduct research.

- **IBN SINA research mentorship program incentives (CPP No. 1438-16)**

This policy describes the different stages of the mentorship program that aims to increase research capacity among R2 junior staff.

- **Archiving Research Records for Intramural and Extramural Studies (CPP No. 1439-27)**

This policy describes the process and procedures for archiving all research documents related to clinical research conducted at R2.

- **Biostatistics Services and Consultations (CPP No. 1439-23)**

This policy aims to provide regulations and procedures for the biostatistics services available to R2 researchers.

- **Knowledge management within KFMC (CPP No. 1444-010)**

This policy aims to develop an efficient health knowledge management, system for collection, dissemination, and utilization of knowledge for improving the quality of health service, information technology, training and research.

- **Monitoring of ongoing intramural research projects (CPP No. 1439-26)**

This policy ensures that the rights, safety, and well-being of human subjects enrolled in clinical research are protected, ensures the credibility and accuracy of research data, and ensures study investigator's adherence with the research project work plan and timetable.

- **Use of Facilities of the Research Laboratories Department (CPP No. 1439-20)**

This policy defines the regulatory approval process for performing clinical research in the research laboratories under the Biomedical Research Administration.

- **Research Clinic (CPP No. 1441-116)**

This policy regulates, provides, and maintains high-quality research for investigators through the utilization of outpatient research clinics by eligible and qualified staff.

- **Biobanking biological samples- biorepository Department (CPP No. 1441-175)**

This policy describes the procedures for the efficient and effective management of the lab team of the biobank department for specimens.

- **Research media coverage (CPP No. 1443-019)**

This policy streamlines the process of choosing scientific research articles to be published in newspapers, social media, television and radio interviews.

R2 SYSTEM-WIDE POLICIES AND PROCEDURES

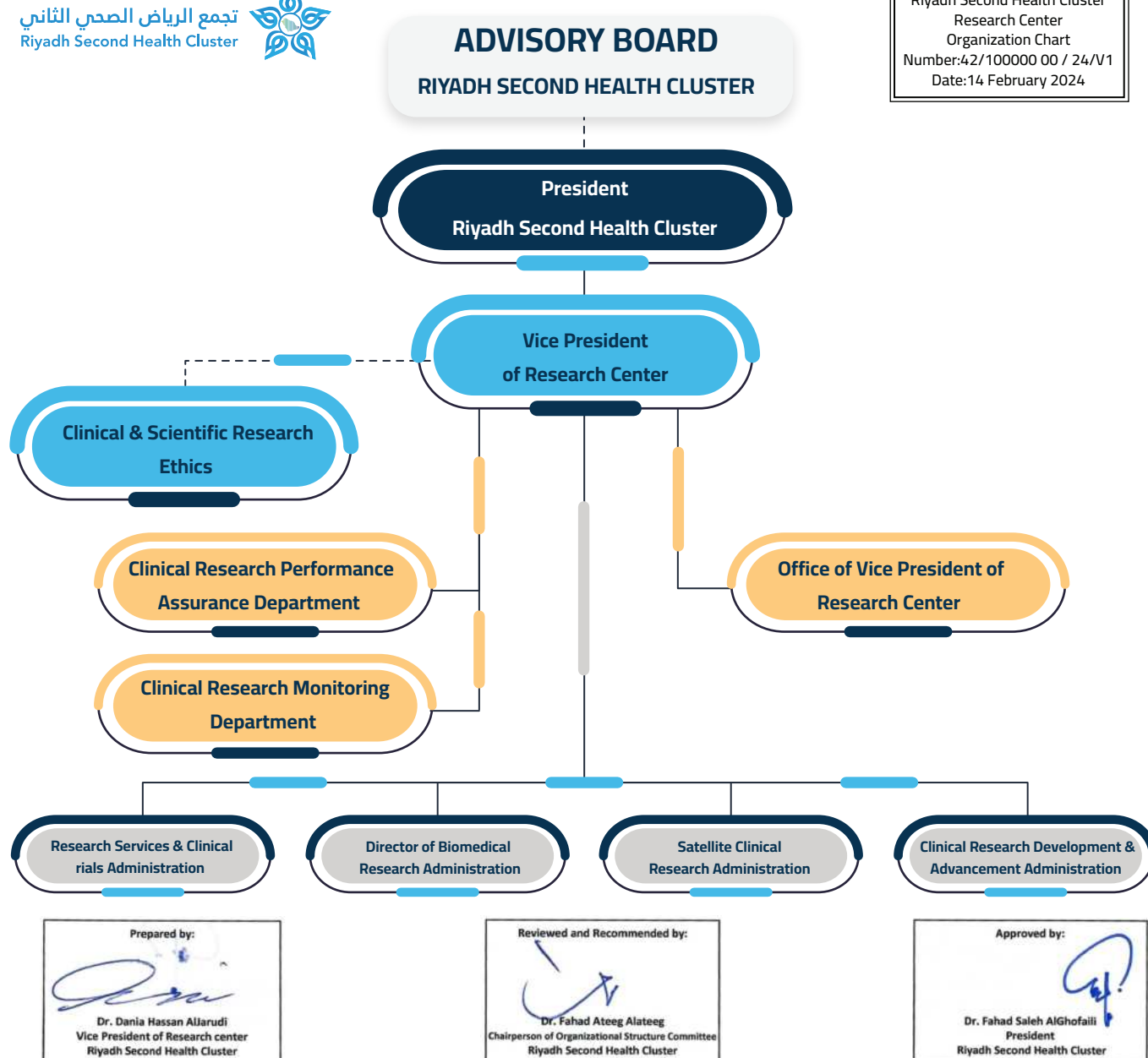
To effectively disseminate the research regulations among R2 staff and adopt a unified approach to the roles and responsibilities of the Research Center.

- Biobanking Biological Samples
- Authorship
- Intramural Research Fund
- Research Protected Time
- Biostatistics Services and Consultations
- Use of Facilities of the Research Laboratories

RESEARCH PRIORITIES

- Mental Health
- Cardiovascular Disease
- Musculoskeletal Disorders
- Diabetes mellitus
- Cancer
- Wellbeing and management of cancer patients
- Population priority: the elderly
- Vaccines
- Antimicrobial resistance
- Healthcare-associated infections
- Endemic diseases
- Emerging-reemerging diseases
- Mass gathering diseases
- Microbial genetics
- Healthcare policies impact
- Healthcare system integration
- Access to healthcare services
- Healthcare financing

RESEARCH CENTER ORGANIZATIONAL CHART



The Research Center provides the necessary research support for investigators throughout the entire research pathway from research question generation to publication. The organizational charts for the Research Center help to streamline its functions and responsibilities.

The following Administrations and departments have to report to the Executive Director of the Research Center:

- Office of Vice President of Research Center
- Clinical and Scientific Research Ethics
- Clinical Research Performance Assurance Department
- Clinical Research Monitoring Department
- Research Services and Clinical Trials Administration
- Biomedical Research Administration
- Satellite Clinical Research Administration
- Clinical Research Development and Advance Administration

OFFICE OF VICE PRESIDENT OF THE RESEARCH CENTER

ADMINISTRATIVE SUPPORT

Core Services

The main responsibility of the office of the vice president of the research center is to look after administrative and managerial issues for the executive director and the entire Research Center. These include liaising between the research center and human capital administration and other administrations, supervising sectorial tasks, and looking after Tamheer trainees.

Vice President and Executive Director of Research Center Highlighted Publications

- Alkhonezan M, Alkhonezan S, **Al-Jaroudi D**. Perrault syndrome: a forgotten presentation for infertile women. Clinical Case Reports. 2024 Nov;12(11):e9522..

Abstract

Perrault syndrome (PRLTS) is an uncommon hereditary condition distinguished by ovarian failure in females and sensorineural hearing loss. This case presentation describes a 22-year-old female from Saudi Arabia with PRLTS. The patient presented with progressive bilateral hearing loss since childhood, impacting her academic achievement. Additionally, she experienced amenorrhea since the age of 18 years, with previous investigations showing no hormonal imbalances. Other laboratory tests, including bone mineral density, kidney and liver function, electrolytes, and lipid profile, showed mostly normal results, except for a slightly abnormal lipid profile with low high-density lipoprotein and high low-density lipoprotein levels. This case highlights the challenges faced by individuals with PRLTS, specifically progressive hearing loss and gonadal dysfunction, leading to infertility. Further evaluation and management are warranted to address the patient's hearing impairment and fertility concerns, with a multidisciplinary approach involving audiology, endocrinology, and reproductive medicine.



- **Al-Jaroudi D,** Maram aldarsooni, Mohammed alfara, Fattimah Albohammod. Effect of premature luteinizing hormone surge on pregnancy outcomes in intracytoplasmic sperm injection or in-vitro fertilization cycles. Front. Med.Sec. Obstetrics and Gynecology, Volume 11-2024.

Abstract

Background: A premature surge in luteinizing hormone (LH) during ovarian stimulation cycles between 12% to 25% has been commonly reported. However, there is still a lack of consensus on whether premature LH surge affects pregnancy outcomes. **Objective:** To evaluate the effect of premature LH surge on pregnancy rate in women with and without premature LH surge during intracytoplasmic sperm injection or in-vitro fertilization cycles stimulation at a tertiary hospital in Riyadh, Saudi Arabia. **Methods:** A cross-sectional study was conducted. Information about 771 women who had IVF/ICSI cycles between January 2022 and December 2022 was reviewed. The patients were divided into two groups based on premature LH surge. **Results:** There was no significant difference in the patient's characteristics. Live birth was significantly higher in the women without premature LH surge compared to women with LH surge (12.9% vs. 5.6%) ($p=0.010$). About the number of oocytes collected, M2, and fertilization rate, it was significantly higher in the women without premature LH surge p -values 0.001, 0.002, 0.004, respectively). **Conclusion:** The study demonstrates a significantly higher live birth rate in women without premature LH surge.

OFFICE OF THE VICE PRESIDENT AND EXECUTIVE DIRECTOR OF RESEARCH

CENTER EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Dania AlJaroudi (daljaroudi@kfmc.med.sa) (dania@dohaim.com)	Vice President, Research Center/Executive Director, Research Center	Research	Infertility	Women's Health	Lifestyle medicine
Ms. Reem AlHakim (ralhakim@kfmc.med.sa)	Chairperson, Office of the Vice President/ Chairperson, Office of the Executive Director	Project Management	Management	Key performance indicators	Human resources
Alhanouf A. Alift (aalift@kfmc.med.sa)	Administrative Specialist	Coordination	Management	Change Management	
Monerah Alsaloum (malsaloum@kfmc.med.sa)	Administrator I	Administrative support	Management		

CLINICAL AND SCIENTIFIC RESEARCH ETHICS

The Clinical and Scientific Research Ethics Committee provides leadership in the protection of the rights, welfare, and well-being of human subjects involved in research conducted or supported by the R2 establishments.

The Committee was established to protect the rights, privacy, and welfare of human subjects participating in research performed at R2 guided by the National Committee of Biomedical Ethics and international regulations.

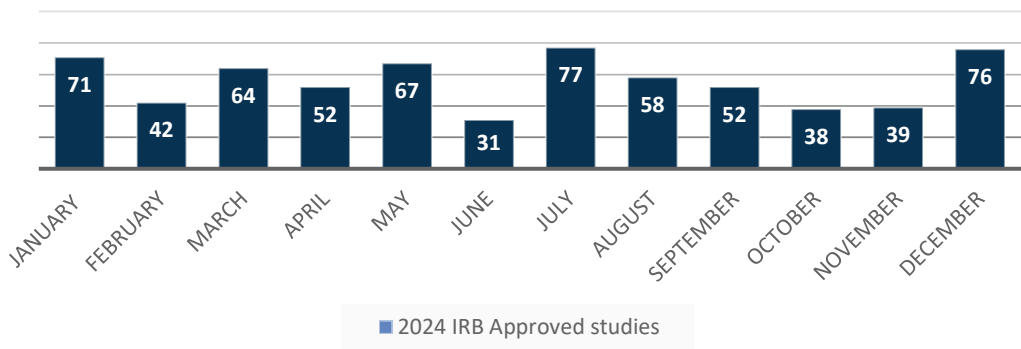
Core Services

- To develop written policies and procedures for the submission and review process for all research proposals guided by the Belmont Report and national rules and regulations.
- To review before initiating, modifying, or extending any research involving human subjects conducted at R2 premises regardless of the source of funding of the study.
- To approve, disapprove, or request modifications to research proposals based on principles that protect the rights, privacy, and welfare of research subjects.
- To ensure integrity in research by addressing conflict of interest, data ownership, and authorship issues.
- To monitor ongoing research projects based on the submission of progress reports by the investigators no less than once per year.
- To observe study performance, examine the informed consent process, and audit the progress of any study under its jurisdiction.
- To suspend, terminate or impose restrictions on previously approved ongoing research projects, if the protocol is violated.

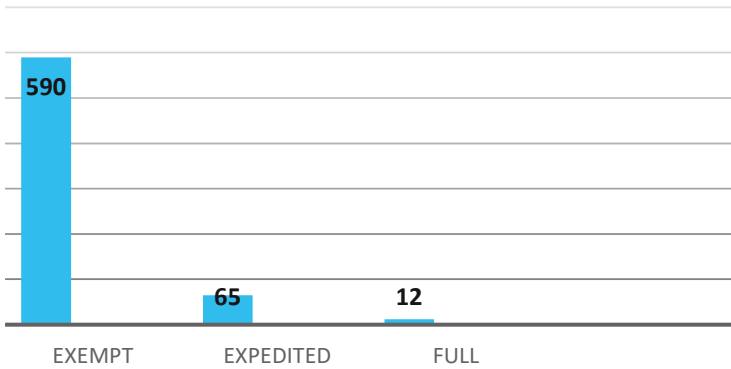
- To review, approve, disapprove, request modifications, and audit all financial aspects between R2 staff and industry funding sources.
- To notify the principal investigator in writing of the IRB decision.
- To ensure that the scientific question being asked within a protocol is relevant and that the design of the protocol is appropriate to answer that question.

Achieved Performance Indicators

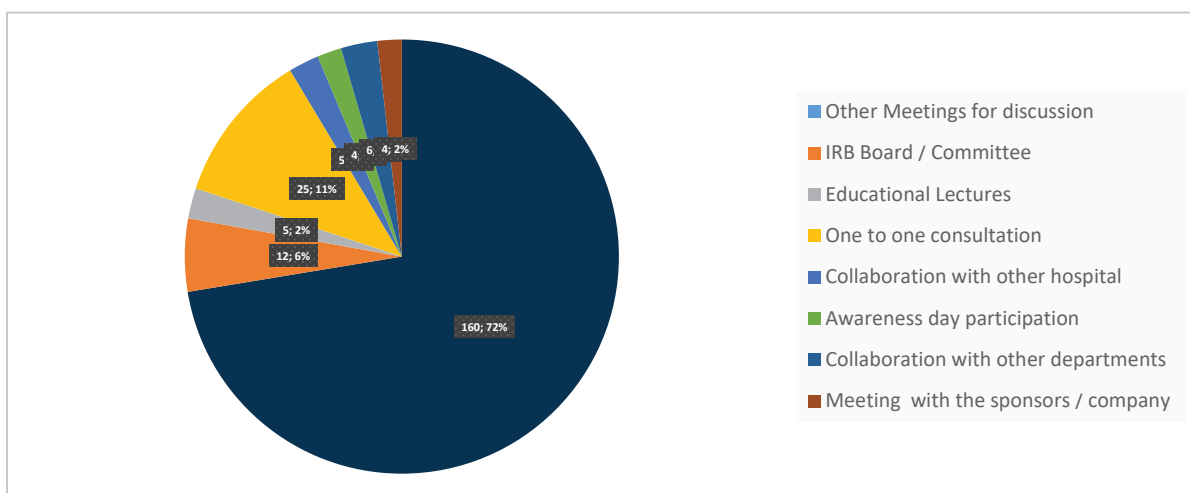
- 746 Research proposal submitted to IRB.
- 667 Research proposal approved by IRB.



Number of research proposal approved by IRB.



Research types of approved proposals.



IRB Activities, Consultations and Collaborations.

CLINICAL AND SCIENTIFIC RESEARCH ETHICS EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Hussam Sakkijha (hsakkijha@kfmc.med.sa)	Chairperson, Research Ethics Department	Intensive care unite	Pulmonary	Sleep	
Ms. Belinda Ortega (Ortegabcortega@kfmc.med.sa)	Medical Secretary II	Medical	Clinical research	Administrative support	Institutional review board

CLINICAL RESEARCH MONITORING DEPARTMENT

The Research Monitoring Department (RMD) was established in 2017 to ensure that clinical research is conducted in compliance with the approved study protocols, amendments, good clinical practice (GCP) guidelines, and applicable regulations. RMD provides support to R2 staff for high compliance with best research conduct standards.

Core Services

- Monitor investigator-initiated clinical trials.
- Monitor industry-sponsored clinical research.
- Manage and ensure compliance with Human Research Protection standards of JCI.
- Manage Research Center Quality Improvement Committee.
- Ensure that the rights and well-being of human subjects are protected.
- Ensure that the reported trial data are accurate, complete, and verifiable from source documents.
- Monitor each funded research project by R2 twice (upon submission of progress and final reports).
- Manage the Ibn-Sina Research Mentorship program to enhance research productivity and allow experienced researchers to mentor junior staff who have no research experience.
- Provide a wide range of research education courses and workshops.
- To provide training workshops on GCP guidelines for R2 researchers.
- Provide research consultations for R2 staff.

Achieved Performance Indicators

- 42 Industry-sponsored studies were monitored.
- 50 IRF
- Funded studies were monitored.
- 5 GCP guidelines workshops were provided.
- 275 R2 staff certified with GCP guidelines
- More than 50 research education hours.

CLINICAL RESEARCH MONITORING DEPARTMENT EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Hussam Sakkijha (hsakkijha@kfmc.med.sa)	Chairperson, Research Ethics Department	Intensive care unite	Pulmonary	Sleep	

CLINICAL RESEARCH PERFORMANCE ASSURANCE DEPARTMENT

This department has been recently established to improve the Research Center's daily operations including human capital, finance, purchasing, research and development (R&D), and quality activities to ensure smooth, efficient, well-coordinated, and productive practices of the Research Center's administrations.

Core Services

- Enhance research operations geared towards operational excellence to improve work quality, productivity, and efficiency in support of R2's mission.
- Ensure the implementation of the research strategic initiatives and operational projects.
- Provide operational advice and support pertinent to enhancing operational work performances and effective and efficient delivery of high-quality operations.
- Support better management reporting and workflow between Research Center directors and other R2 entities.
- Manage the quality improvement committee and initiative.
- Plan and execute quality performance projects across Research Center's departments.
- Promote the implementation and adherence to policies, processes and operating procedures to others within KFMC.

Highlighted Publications

- Al-Awamer A, **AlFayyad I**, Abosoudah MF. Islamic Bioethics: Palliative Sedation. In Oxford Research Encyclopedia of Religion. 2024 Nov 20.

Abstract

Palliative care aims to relieve the suffering of terminally ill patients and their families through the effective management of pain and other distressing symptoms. Depending on symptom severity, different levels of sedation are required to palliate symptoms effectively. However, Islamic jurisprudence forbids and criminalizes any act intended to terminate a patient's life. Jurists have attempted to determine the permissibility of palliative sedation from an Islamic perspective while referencing the ethical principles and legal maxims of Islamic jurisprudence (Al-Qawā'id al-Fiqhiyah). Palliative sedation may be permissible as a last resort for imminently dying Muslim patients based on the principle of necessity.

- Awwad S, Alnasr RA, Almanjomi F, Al Sultan M, Howaidi J, Almotairi M, **AlFayyad I**. Peg-asparaginase associated toxicities in children with acute lymphoblastic leukemia: A single-center cross-sectional study. *Pediatric Hematology Oncology Journal*. 2024 Mar 1;9(1):54-62.

Abstract

Background: Leukemia is the most prevalent type of cancer affecting children, representing approximately 35% of cancer diagnoses in Saudi Arabia. Notably, significant improvement in the overall survival and cure rates for pediatrics with acute lymphoblastic leukemia (ALL) has been attributed to adding asparaginase to the chemotherapy regimen. However, the administration of these agents may lead to a multifactorial range of toxicities that often alter treatment outcomes. **Objective:** The study aimed to characterize the prevalence of common toxicities related to polyethylene glycol (PEG) asparaginase in children aged 0–14 years diagnosed with ALL. Additionally, it assessed the types of toxicities associated with intravenous (IV) and intramuscular (IM) administration of Peg-asparaginase. **Method:** It was an observational retrospective cross-sectional study. Data was extracted from the hospital's electronic health record (EPIC). Using EPIC, we reviewed medical charts of all pediatric patients below 14 years old diagnosed with ALL who received at least one dose of PEG-asparaginase between January 2020 and March 2023. The toxicity grading was based on the National Cancer Institute Common Terminology Criteria for Adverse Events (CTCAE). **Results:** One hundred and ninety-one patients with ALL were included in the study. Overall, 79 toxicity episodes were experienced by the study patients. Anaphylaxis/hypersensitivity (36.7%) and hepatotoxicity (31.6%) were the most prevalent toxicities reported, followed by pancreatitis and hyperglycemia (12.7% each). According to the CTCAE grading, approximately 70% of toxicities were categorized as Grade 3 and 4. Notably, 60% of the events occurred during the induction and consolidation phase of therapy. Interestingly, there was no significant difference in rates of toxicities between patients receiving IV or IM PEG-asparaginase. **Conclusion:** The distribution of toxicities highlighted in our study aligns with findings from previously published studies. Furthermore, multivariate analysis indicated that patients with high-risk ALL and T-ALL were more likely to develop toxicities compared to other forms of ALL.

- Abu-Shaheen, A., Ayyash, M., Osman, E. A., **AlFayyad**, I., Dahan, D., Torjoman, A., Zameer, S. ., & Heena, H. (2024). Vision-Related Quality of Life Among Glaucoma Patients in Saudi Arabia: A cross-sectional study. Sultan Qaboos University Medical Journal, 1(1).

Abstract

Objectives: This study aims to examine the impact of glaucoma severity and socioeconomic factors on perceived VRQoL among patients diagnosed with glaucoma in Saudi Arabia. **Methods:** This cross-sectional study was conducted on adult glaucoma patients attending the ophthalmology outpatient clinics at King Fahad Medical City (KFMC), and King Saud University Medical City (KSUMC), Riyadh, Saudi Arabia, over the period from May 2022 to May 2023. The validated Arabic translation of the 39-item National Eye Institute Visual Function Questionnaire (NEI VFQ-39) was used to measure VRQoL. Multivariate linear regression is performed to examine the associated factors of VRQoL. **Results:** A total of 454 adult patients with glaucoma were included in this study. The mean age of patients was 60.8 ± 15.0 years. Most patients had severe glaucoma (42.5%), were female (54.2%), married (67.8%), unemployed (55.3%), with an income level of less than SAR 10,000 per month (35.9%), and about one-third had lower secondary education (32.8%). About 24.4% of them reported that they required care assistants and 31.9% of them live with care assistants. The mean of the overall composite score (OCS) of NEI VFQ-39 was 71.0 ± 21.3 . The severity of glaucoma, education, employment status, needing care assistance, and having care assistance from others were significant factors of VRQoL in patients with glaucoma in Saudi Arabia. **Conclusion:** Perceived VRQoL among Saudi adult glaucoma patients is influenced by glaucoma severity, education, employment, and care needs. The study informs healthcare providers to enhance patient care and thereby improve patient QoL.

- **Al-Madaney, M.M.,** Fässler, M. Development and validation of a tool to assess researchers' knowledge of human subjects' rights and their attitudes toward research ethics education in Saudi Arabia. *BMC Med Ethics* 24, 94 (2023). <https://doi.org/10.1186/s12910-023-00968-z>

Abstract

Background: Researchers must adhere to ethical and scientific standards in their research involving human subjects; therefore, their knowledge of human subjects' rights is essential. A tool to measure the extent of this knowledge is necessary to ensure that studies with participants are conducted ethically and to enhance research integrity. Currently, no validated instrument is available for such an assessment. Therefore, the primary purpose of this study is to develop a reliable and valid instrument to assess researchers' knowledge of human subjects' rights in clinical settings, as well as a reliable and valid measure of their attitudes toward clinical research ethics education in Saudi Arabia. **Methods:** The current study involves the development of a questionnaire about the rights of human subjects in research and the researchers' attitudes toward research ethics education. The content was developed based on an extensive review of research ethics guidelines. A panel of experts tested the questionnaire for face validity (n = 5) and content validity (n = 8). The reliability of the questionnaire was established by a split-half reliability coefficient and item analysis among a sample (n = 301) of clinical researchers. **Results:** Face validity demonstrated that the questionnaire was quick to complete and easy to answer. The global content validity indices (S-CVIs) were greater than 0.78 for all questionnaire sections; the split-half reliability coefficient was 0.755 for knowledge items; Cronbach's alpha was 0.77 for researchers' attitudes, showing good internal consistency. The difficulty index ranged from 12.0% to 98.7% for all knowledge items. Most questions were at an acceptable level of reliability and discrimination criteria. The final version of the questionnaire contained 89 items, distributed as 15 questions on demographic and professional characteristics, 64 questions items on knowledge, and 10 items on attitudes. **Conclusions:** The questionnaire is a valid and reliable tool to assess biomedical researchers' knowledge of human subjects' rights and their attitudes toward research ethics education. This instrument could help address the gap in researchers' knowledge of the rights and facilitate the development of educational intervention programs to set appropriate learning objectives.

- **Al-Madaney, May.** (2023). Informed Consent in Human Subjects Research: A Comparison of International and Saudi Arabian Guidelines. *Journal of Clinical Research & Bioethics*. 14:475. 14:475. 10.35248/2155-9627.23.14.475.

Abstract

Objective: Informed Consent (IC) is an essential requirement for the conduct of medical research involving human subjects. Since the Nuremberg Code was adopted in the aftermath of the Second World War, various international guidelines have specified the conditions for a valid IC for medical research. Among the most relevant guidelines are the World Medical Association’s Declaration of Helsinki, the guidelines of the Council of International Organization of Medical Sciences (CIOMS), and the Good Clinical Practice Guidelines of the International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use (ICH-GCP). This paper aims to compare the above-mentioned international guidelines with Saudi Arabia’s Law of Ethics of Research on Living Creatures regarding the requirements for IC. The comparison also includes some relevant regional and domestic laws. The objective of the study is to determine whether the compared regulations coincide regarding the requirements for a valid IC or whether they show significant differences, and to what extent such requirements are also present in Saudi Arabia’s regulations. **Methods:** We conducted a content comparative analysis of the above-mentioned guidelines regarding five elements of IC: Disclosure, comprehension, voluntariness, competence, and form of consent. These five topics were subdivided into 44 subtopics. Then we compared and critically analyzed their similarities and differences. **Results:** The similarities and differences observed in the seven guidelines are summarized under the five components of IC mentioned above and regarding 44 selected subtopics. **Conclusion:** The analysis of the above-mentioned guidelines shows that while the most basic components of IC are present in all the compared documents, there are some differences between them. Specifically, the study found that the Saudi Arabian regulations include 26 of the 44 subtopics considered and that most of the elements that are missing relate to the disclosure of information to participants.

Clinical Research Performance Assurance Department Expertise

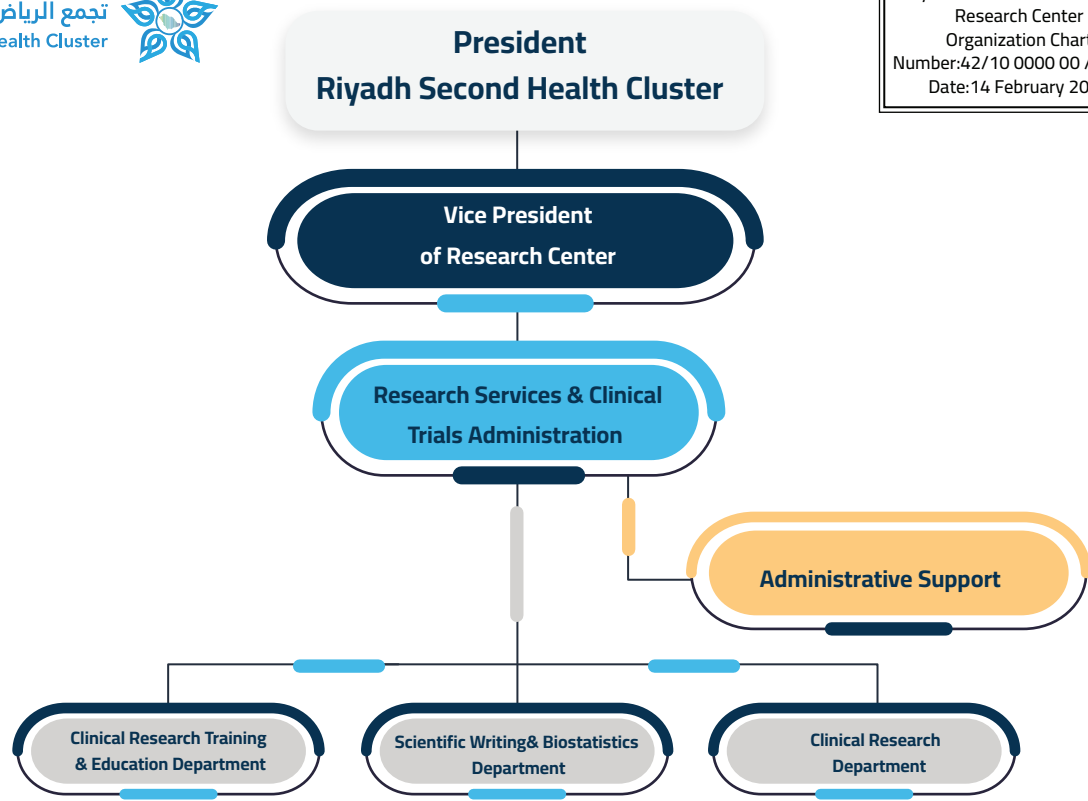
Name	Position	Specialization Area Keywords			
Mr. Issam AlFayyad (ialfayyad@kfmc.med.sa)	Chairperson, Research Operations Department	Clinical research	Research education and training	Clinical research management	Bioethics
Dr. May Mohammed Al-Madaney (malmadaney@kfmc.med.sa)	Senior Clinical Research Specialist/ Co-Chairperson, Institutional Review Board	Biomedical Ethics and Legal Frameworks	Human Subjects Protection	Clinical Trial Oversight and Ethics	Informed Consent in Medical Research

RESEARCH SERVICES AND CLINICAL TRIALS ADMINISTRATION

ORGANIZATIONAL CHART



Riyadh Second Health Cluster
Research Center
Organization Chart
Number: 42/10 0000 00 / 24/V1
Date: 14 February 2024



Prepared by:

Dr. Dania Hassan AlJarudi
Vice President of Research center
Riyadh Second Health Cluster

Reviewed and Recommended by:

Dr. Fahad Ateeg Alateeg
Chairperson of Organizational Structure Committee
Riyadh Second Health Cluster

Approved by:

Dr. Fahad Saleh AlGhofaili
President
Riyadh Second Health Cluster

This administration provides research support services, enabling researchers to conduct high-caliber research through the following departments:

- Scientific Writing and Biostatistics Department
- Clinical Research Department
- Clinical Research Training and Education Department



SCIENTIFIC WRITING AND BIOSTATISTICS DEPARTMENTS

Our efforts in the Scientific Writing and Biostatistics Departments were expanded to create a strong research environment. Providing timely and efficient services that include scientific editing, rewriting, proofreading, statistical analysis, sample size calculation, consultations, and training was our utmost priority to ensure that it is a reliable department in which R2 researchers put their trust.

Core Services

- Publishing guidance to assist authors in turning their research manuscript into a published article through either the internal team or with the aid of outsourced scientific editing and writing services.
- Helping to identify the relevant journal for publication and submission guidelines.
- Guiding authors on how to respond to journal reviewers' comments.
- Preparing the R2-Research Center Annual Report.
- Reimbursing the scientific writing/editing and publication coverage charges.
- Assist researchers in designing their studies and experiments.
- Sample size and power calculation.
- Grant proposal preparation and review.
- Randomization, data management, and data entry and analysis.
- Provide consultation for the type of study application and statistical methods suitable for the study design and groups.
- Structure Graphs and tables generation.
- Conduct beginners and advanced statistical courses with practical application to the SPSS program.

Scientific Writing Department Automated Services:

Protocol and manuscript writing/editing services

Assists authors in transforming their research manuscripts into published articles through multiple consultation sessions of scientific editing and writing services.

Financial manuscript/publication charges services

The scientific writing department covers editing service fees and publication coverage for R2 staff as per the R2 policies.

Journal credibility and selection

Assists and provide guidance to researches and authors in determining and choosing a reputable journal based on the field of the manuscript.

Biostatistics services

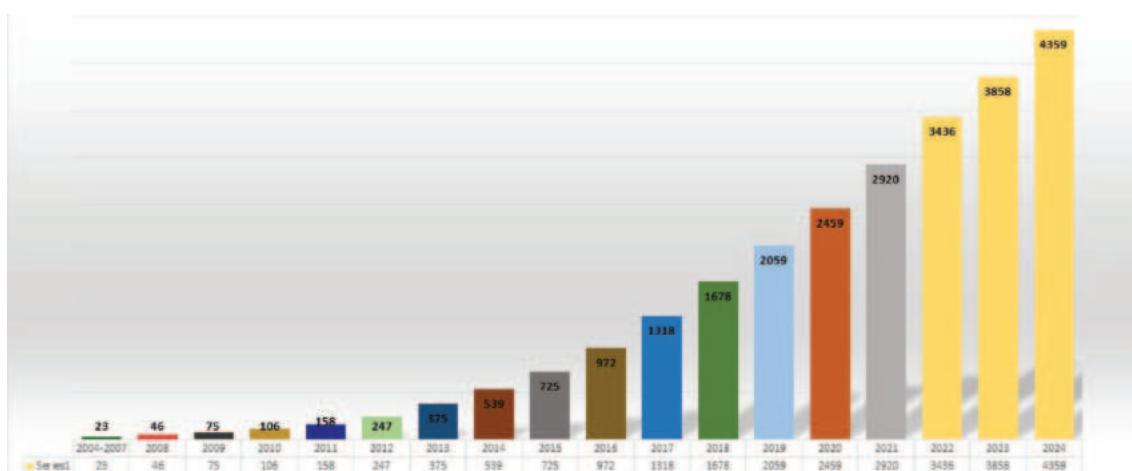
The department provides statistical analysis services, sample size calculation, consultations, and training to R2 staff.

General Inquiry

The scientific writing and biostatistics department responds to general questions from authors about scientific writing and other research inquiries.

Achieved Performance Indicators

- 67 Editing and writing services.
- 21 Educational outreach lectures.
- 12 Scientific writing and biostatistics educational activities.
- 13 Publications by SWD staff.
- 326 One-to-one consultations.
- 62 Served fellows and residents.
- 128 Studies served for biostatistics.
- 380 Statistical services.
- 66 Sample size calculations.
- 30 Statistical analysis provided for IRF projects.



Cumulative Number of Publications 2004-2024

Agreements and Collaborations

- King Faisal Specialist Hospital and Research Center.

Ongoing Projects

- A Goat Epistaxis Model: Hemostatic Effect of Stop Nosebleeds Device.
- Exploring the Therapeutic Potential of Carob (Ceratonia siliqua) Extract for Mouth Ulcers: A Mouse Model Study.
- Effectiveness and Safety of Stop Nosebleeds Device in Patients with Epistaxis: A Randomized, Open-Label-Controlled Trial.



CLINICAL RESEARCH TRAINING AND EDUCATIONAL DEPARTMENT

The department is responsible for the educational principles of research foundations among R2 staff through continuous training and educational activities.

Core Services

- Running continuous updated educational programs.
- Organize research education and training courses.
- Develop and provide relevant training programs for research activities compliance with good science, relevant regulations, and updated guidelines.
- Provide outreach theoretical and practical research training lectures and courses to different hospitals, centers, residency training programs, and administrations.

Achieved Performance Indicators

- 19 Educational calendar activities.
- Over 390 Attendees of the research courses.
- 4 Workshops.
- More than 28 hours for outreach educational activities outside R2.
- 6 Research training courses for residents.
- 3 Research awareness days.

Annual Scheduled Activities

A calendar of activities, including lectures and workshops on different topics, was conducted and attracted many attendees.

Annually scheduled research educational activities for 2024 were as follows:

Research Center Educational Calendar 2024		
January	February	March
10 – 11 Biomedical Research Training Program* (for undergrad students) 14 - Clinical Research Coordinator Certificate 21 Jan – 1Feb Clinical Research Course for Pediatric Residency Program* 24 - Data Collection skills using Epic Research Module	18 – 29 Clinical Research Course for Pediatric Residency Program*	03 - 04 Mastering the Art of Scientific Writing and Biostatistics Workshop 24 Mar – 4 April Clinical Research Course for Pediatric Residency Program*
April	May	June
21 - 23 April Advanced precision medicine Workshop 21 April -02 May Clinical Research Course for Pediatric Residency Program*	13 - Research Center Awareness Day	30 June - 18 July Clinical Research Summer Course*
July	August	September
30 June - 18 July Clinical Research Summer Course* 10 - Clinical Trials: The Future of Healthcare	04 – 15 Translational Research Summer Workshop 3 rd *	16 - One to One Research Open Day
October	November	December
06-07 Mastering the Art of Scientific Writing and Biostatistics Workshop 14 - 16 Genomic & Precision Medicine Conference & workshops		19 - Clinical Trials: The Future of Healthcare 23 – 26 19 th Annual Research Conference

How to Write a Successful Research Proposal?

The goal of this 3-hour workshop was to systematically teach the process by which a conceptual idea for a clinical research project is converted into a research proposal or grant application. A detailed description of the anatomy of a proposal was given, as well as tips on how to write a successful grant proposal. Particular emphasis on budget calculation and reviewers' considerations was also given.

How to Write Research Manuscript?

The purpose of this workshop was to educate investigators about the overall organization of a manuscript, and the structure and function of each of the components. The workshop described the research path, starting with the development of a good scientific question, through a well-structured proposal, to the manuscript itself. Participants learned about the journey of manuscript submission and the peer review process and received tips and guidance on how to respond to reviewers' comments. This workshop aimed to encourage investigators to produce a complete and polished manuscript that is suitable for submission to a peer-reviewed journal.

Biostatistics and SPSS package in the clinical, laboratory, and health setting

The use of biostatistics is essential in understanding evidence-based medicine and modern medical approaches. It is also pivotal in clinical, non-clinical, and quality control research in the healthcare sector. The objective of this workshop was to learn the concepts of biostatistics and the basic statistical techniques to healthcare professionals through the utilization of the commonly used statistical package i.e. SPSS (Statistical Package for the Social Sciences)

Clinical Research Training Course (CRTC) for Healthcare Providers

This course contained four lectures and three workshops spread over two consecutive half-days. It focused on the different study designs used in clinical research, with an emphasis on the advantages and disadvantages of each as well as basic epidemiological measurements. Basics in biostatistics cover all the relevant topics.

How to do a Systematic Review and Meta-Analysis Training

Systematic review & meta-analysis is important in the decision-making process.

The objective of this course was to define the elements of systematic review protocol writing and to describe the systematic review process by employing RevMan software for pooling out the results of the included studies



DNA and RNA extraction and purification

This activity was intended to take the participants on a journey into the molecular biology world. It was designed to address different topics that cover the subject matter and link the theories to the experiments. By the end of the workshop, the participants were able to plan and execute any experiment implying the use of DNA or RNA.

Protein Purification: Strategies and Techniques

This a rerun of a course that was held twice before, and the turnout showed that there was a huge demand for such activity. From the recommendations of the last run this year the course was expanded to three days. The theoretical part of the workshop covered the recent advances in the protein biochemistry world. By the end of the workshop, the participant was being able to purify and measure the activity of any individual protein.

Biosafety and Biosecurity in Research Laboratories

This course provided an overview of the critical aspects of biosafety, biosecurity, and biocontainment and aimed to increase behavioral compliance with biosafety procedures. Participants learned how to assess risks for biohazards in the laboratory setting and the strategies to appropriately manage these risks.

Other Educational Activities

Clinical Research Coordinator Program (CRC)

The CRC program was established due to the massive shortage of Saudi citizens working in the research field. This project covered the actual need at our research center and other departments were there is a big demand for CRC graduates. Additionally, it was established to meet Riyadh's second health cluster and MOH requirements.

The clinical Research Coordinator (CRC) program provides foundational and advanced role-based training for clinical research professionals. The one-year program covers information directly connected to clinical research, Good Clinical

Clinical Research Coordinator Program (Specialized Professional Program)

3/4/2024 to 3/4/2025 (1 year) | 8:00 A.M. - 15:00 P.M. | Faculty of Medicine, 2nd floor - classroom 213, King Fahad Medical City | Registration Fees: 25,000 SR (including Value Added Tax (VAT) of 15%)

Program Objectives:

- Meets the needs of the growing market of pharmaceutical industry clinical research through preparing a generation of specialized research professionals.
- Creates a nation-wide, harmonized career path for clinical research staff with appropriate training.
- Conducts all research coordination activities with the highest ethical, legal, and scientific standards in accordance with Saudi and international regulatory requirements.
- Understands the roles and responsibilities of the Clinical Research Coordinator (CRC)/Clinical Research Associate (CRA).
- Discusses the importance of Good Clinical Practice (GCP) and SFDA guidelines and institutional standard operating procedures (SOPs).
- Understands the investigator and sponsor's responsibilities in a clinical research/trial.
- Understands the role and responsibilities of Institutional Review Board (IRB).
- Defines informed consent requirements and learn the process of conducting informed consent.
- Defines safety reporting: Definitions and reporting requirements.
- Discusses regulatory compliance and quality assurance as it relates to audits and inspections.
- Train researchers how to do data management and analysis.

Program Requirement:

- Applicants should have a minimum of 4 years' post-secondary education in medicine, pharmacy, nursing, college of science or clinical disciplines.
- Current Saudi Council for Health Specialties License and Certificate Holder.
- Have a valid English proficiency certificate (IELTS: overall 6, TOFEL: 60-78, or equivalent score in any credible and affordable tests) or pass KFMC institutional English proficiency tests.
- Previous clinical experience is preferred.
- Pass individual interviews with the candidate selection committee.

Upon program completion, a Specialty Competency Certificate will be added to the trainee's Mumaris Plus record

Continuous professional Development Administration - CPD - Support Department
Email: CPD@KFMC.MED.SA, Ext: 10941, 10945, 10949
For more inquiries: ATACC@KFMC2.MED.SA
Tel. No: 8001277000

Practice (GCP), epidemiology, clinical trials, and statistical analysis. This prepared those prospective individuals with the proper qualification to be CRC.

This program was designed for competent Saudi national graduates who are resilient and able to cope with challenges. The focus was on practical issues to allow research coordinator graduates to cover R2 demands. It is expected that the graduates will work as clinical research coordinators.

This project is updated annually with a comprehensive education on how to utilize the most recent technologies in research conduction.

About the CRC Program

The program was initially planned to accept a maximum of 30 candidates. The candidates are considered as “clinical research students” having full access as a Clinical Research Coordinator III. They are officially qualified as Clinical Research Coordinator III after they successfully pass the course in all modules and have completed fully their research projects.

Each candidate was expected to complete at least one clinical study in cooperation with the main researcher and work on at least one research project independently as a principal investigator of the study.

Objectives of the CRC program

- To fill the massive shortage in R2 with Saudi citizens capable of working independently in a research institution.
- To prepare and qualify Clinical Research Coordinators to work inside and outside the organization.
- To take the lead in conducting clinical research in Saudi Arabia through comprehensive and up-to-date research education and clinical training.
- Teach the foundation of research that would be included within curriculum guidelines.

Modules taught in the CRC program

There are over a dozen modules taught in the CRC course including clinical trials, epidemiology, evidence-based medicine, etc. Before the start of the main modules, students are taught intensive English language and data management modules to bring the students from different educational levels to roughly an equal level in terms of their English capabilities and computer skills. The students also study medical terminology, which is covered in the English module. Below is an illustration of the modules taught in the CRC course along with the start and end date of each module:

- Intensive medical and scientific terminology English course.
- Introduction to CRC program and modules format.
- Clinical epidemiology.
- Study design.
- Research Bioethics.
- Pharmacology.
- Clinical trials.
- Bioinformatics.
- Experimental and lab.
- Scientific and Medical Writing.
- Evidence-based medicine.
- Data Management & Biostatistics I and II.
- Primary care.
- Research Project finalization / Manuscript presentation



CRC ATTENDEES 2019 – 2024

- 6 Students in 2024 – present
- 8 Students in 2022- 2023
- 10 Students in 2020 – 2021
- 17 Students in 2019 – 2020

RESEARCH METHODOLOGY COURSE FOR PEDIATRIC RESIDENTS

The course aimed to improve the awareness and understanding of young trainees in basic research principles.

This course contained different sessions and provided an overview of how to plan and conduct a research project.

Major topics included identifying research questions, techniques of literature search, basic principles of research methods, types of study designs, measures of disease frequency and association, questionnaire development, ethical issues involved in human subject research, and data and bibliography management.

RESEARCH SUMMER COURSE

The Clinical Research Summer Course aimed to build the research capacity among future healthcare workers by enhancing their research critical thinking and scientific writing skills to increase research productivity. The teaching methodology of this event was a mixture of virtual presentations, hands-on training, and mentoring during the different stages of the research pathway. This course was intended for interns, medical students, dental students, and allied healthcare students.





KFMC Pediatrics

Residency

Research Course R2/R3

 In collaboration with the Research Center

King Fahad Medical City

Course Description:
 This course is designed to introduce candidates to quantitative and qualitative methods for conducting meaningful inquiry and research.

Objectives:

- Learn how to do research in a scientific and practical way
- Motivate the candidates to build their own research skills
- Introduce the candidates about health research and its importance for future center
- Increase number and quality of research conducted in Saudi Arabia
- Highlight the importance of research and how it can serve the health field and community
- Create a competitive atmosphere in health research between participants

Target Groups:
 The target groups include all those who are interested in conducting research in different aspects of medical, pharmaceutical and other health related personnel. This course is designed to address the needs of different candidate levels. Postgraduate candidates might include residents and fellows of different Saudi Board Programs.

2024
 21 Jan - 01 Feb
 18 - 29 Feb
 24 Mar - 04 Apr
 25 Apr - 02 May

Classrooms:
 Faculty of Medicine Third Floor
 303
 303
 303
 303

30 limited seats **09:00 - 15:00**

Submitted to instructions from the Ministry of Health.

 Registration Fee: 2,500 SAR (including VAT 15%) for all courses

For more information and inquiries:
 Administrative: Continuous Professional Development Administration -
 Support Department
 Email: CPD@kfmc.med.sa | Extension: 10001, 10001, 10008
 Email: AKACCD@kfmc.med.sa | Tel: 800077000







Research Summer Course

 In Collaboration With Research Center

30 June to 18 July 2024 **9:00-16:00** **King Fahad Medical City, Cochlear building 3rd floor / the theater**

Objectives:

- Describe the basic concepts in epidemiology and biostatistics.
- Apply SPSS statistical software.
- Define research question and hypothesis.
- Practice research proposal and manuscript writing.
- Identify regulations of research ethics.
- Practice literature review searches.

Course Content:

- How to formulate a research question?
- Literature review and critical appraisal.
- Basic measurements of epidemiology.
- Interpretation and presentation of results.
- GCP in clinical research.
- Writing a grant application.
- Writing a manuscript.
- Basic Biostatistics.
- Study designs.

Registration fees: 2,500 SR *include 15% VAT
Target Audience: Health care students (Medicine & Allied Health Science)
Limited Seats (100)

For information - please contact:
 Contact name: The Operational Development Unit Administration
 CPD Support Department
 Email: CPD@kfmc.med.sa | Extension: 10001, 10005, 10049
 Fax: 800077000
 Email: AKACCD@kfmc.med.sa | Tel: No. 800 777000

Registration Link:




CLINICAL RESEARCH DEPARTMENT (CRD)

The primary aim of the Clinical Research Department (CRD) was to conduct research projects that conforms to the highest standards for the protection of human research subjects offering world-class clinical solutions and accelerating the delivery of innovative treatments to improve the health and wellness of people everywhere. Additionally, this department streamlines the cycle time of clinical trials.

CORE SERVICES

- To manage all clinical trials conducted at R2.
- To encourage the pharmaceutical industry, biotechnology, and other national and international agencies to conduct clinical trials at R2.
- Negotiating clinical trial agreements and budgets.
- To assign clinical research specialists to assist in ongoing clinical trials.
- To enhance the investigators' understanding of clinical trial conduct and their responsibilities by providing educational training courses in clinical research.
- To liaise clinicians with different R2 departments for research opportunities.

Achieved Performance Indicators

- 32 Ongoing industry-sponsored clinical trials.
- 1,637,475.12 SAR total revenue generated from industry-sponsored clinical trials in 2024.
- 4 New industry-sponsored studies were initiated.

Ongoing projects

- Patient attraction and awareness campaign.
- Physician attraction and awareness campaign



HIGHLIGHTED PUBLICATIONS

- AlSerehi AA, Al Mufarrih BM, **Abu-Shaheen A, Saleh A**, AlSheef M. Safety of pregnancy after cerebral venous thrombosis: A case-control study. Health Science Reports. 2024 Feb;7(2): e1872.

Abstract

Background and objective: Since pregnancy is considered one of the major risk factors of cerebral venous thrombosis (CVT), the safety of pregnancy in women of childbearing age and a previous history of CVT, is concerning in terms of prevention, family planning, and management. This study aims to estimate the prevalence of pregnancies among women of childbearing age with previous CVT, evaluate the pregnancy-associated risk of CVT recurrence, and explore the maternal and fetal outcomes among CVT women in comparison with pregnant women without a history of CVT. **Methods:** A retrospective, case-control study was conducted at the Obstetrics Departments of King Fahad Medical City Hospital, Saudi Arabia. It included all women with a history of CVT diagnosed in the last 5 years (cases), as well as CVT history-free pregnant women (control). The prevalence of pregnancy after CVT was estimated and the prepartum and postpartum parameters of the two groups were compared. **Results:** Fifty women with CVT and 100 controls were included. Among the 50 CVT cases, 28 (56.0%) have been pregnant. The incidence of pre-eclampsia was significantly more frequent in CVT women (7.1% vs. 0.0%, $p = 0.047$); however, only one case of deep vein thrombosis (3.6%) was reported in CVT patients versus none in controls ($p = 0.219$). CVT women delivered at a lower gestational age (mean [SD] = 36.9 [3.5] weeks) compared with controls (38.3 [1.4] weeks) ($p = 0.006$). No significant differences in other pregnancy or delivery outcomes were observed between the two groups. **Conclusion:** More than half of women of childbearing age with a history of CVT opt for pregnancy after the CVT episode, with no major additional risk for pre or postpartum complications.

- **Bin Nafisah, S.,** Alhutrushi, A. M., Abanmi, A. A., Abujamous, M. H., Sabbah, L. H., AlSalehi, L. S., Alzahrani, Z. K. . . , Alwabel, A. A., Alhomod, A. S., & Alsubaie, M. S. Emergency Medicine and Rapid Response Virtual Team (EM-RRVT): Insights from the Hajj 1445/2025 Experience. The Journal of Medicine, Law & Public Health, 5(2).

Abstract

background: The use of telemedicine in acute care settings has not been investigated in large mass gatherings. Further exploration is needed to determine its efficacy, and applicability and to explore challenges and opportunities. **Objective:** This study aims to evaluate a pilot deployment of the virtual emergency team during one of the largest mass gatherings in the world, the Hajj religious season. **Methods:** The Emergency Medicine and Rapid Response Virtual Team (EM-RRVT) was launched from June 13 to July 6, 2024. The pilot was conducted in phases, with Phase One occurring in Mecca from June 13 to June 19. Subsequently, the team was activated on an on-demand basis. The team's role was to complement the on-ground teams as well as various emergency departments. **Results:** The team encountered a total of 324 patients from 20 countries, with a variety of medical conditions. The most prevalent condition was acute coronary syndrome, followed by trauma, within the peak hours from 10:00 to 22:00 coinciding with the movement of pilgrims. Over half of the patients were treated and released back to their Hajj contingents during surge hours. **Conclusion:** The use of telemedicine in an acute setting showed promising results. The establishment of the Emergency Medicine and Rapid Response Virtual Team proved to be both feasible and applicable. The scalability and flexibility of the service contributed to its efficiency.

- AlMahameed MI, Kakish SF, **Abu-Shaheen A**. Experience of conducting a group patient education program at a tertiary hospital in Riyadh. Saudi Journal of Health Systems Research. 2024 Jun 3;4(2):64-73.

Abstract

Background: Patient education plays an essential role in improving patient compliance with treatment. Therefore, the study aimed to assess the healthcare educators' and the patients' and their companions' satisfaction and experience with regard to the health education program conducted during their waiting period in the outpatient department (OPD) at King Fahad Medical City. Moreover, compliance with planned educational topics was also assessed. **Methods:** A pre-post interventional study, including patients and their companions as well as health educators in the waiting rooms of the various OPDs, was conducted. The pre-intervention phase involved group teaching sessions, followed by a survey that assessed patient and educator satisfaction and experience as well as compliance rate. Then, a loophole identification survey was conducted to determine the drawbacks based on which group teaching procedure was modified. Post-intervention, a modified teaching session was completed. **Results:** A total of 4,362 patients and their companions participated in this study, along with 22 health educators. During the pre-intervention phase, the patient and their companions reported a 78% satisfaction rate for the conducted patient and family educational activities. While, after improving the group teaching process, the satisfaction rates increased to 90% in the post-intervention phase. The health educators' satisfaction rate improved remarkably from 27.3% to 86.4%. **Conclusion:** By incorporating simple modifications in the educational activities, a higher satisfaction rate might be achieved among the participants and the health educators.

- Alshammari A, Alshammari A, AlJabran Y, **Bin Nafisah S**. Optimizing Paediatric Paracetamol Dosing: Transitioning from Age-Based to Automated Weight-Based Calculations in Saudi Arabia. The Journal of Medicine, Law & Public Health, 5(2).

Abstract

Background: Paracetamol is one of the most commonly used over-the-counter (OTC) medications for managing conditions in paediatric patients. **Objectives:** To evaluate the accuracy of paracetamol dosages based on age in the paediatric population, compared to the doses calculated based on body weight, and to propose automated solutions aimed at optimizing the dosing and dispensing of OTC medications. **Methods:** This retrospective cross-sectional study was conducted using health records of randomly selected patients aged 0-13 years. The weight-based dose was calculated using standard dosing of 15 mg/kg/ dose and compared to the age-based doses recommended in the drug leaflet. **Results:** A total of 352 pediatric patients were included; [Mean age of 5 years, 4.8 months (SD = 48 months), with a median weight of 16.9 kg, (IQR: 10.4 to 25.75)]. We observed that 71.59% of patients (n = 252) are likely to be under-dosed when using age-specific dosages compared to their actual weight. Conversely, 27.56% (n = 97) could be overdosed, and only 0.85% (n = 3) received an accurate dose. Additionally, the discrepancies between the age-based and weight-based doses range from 1 mg to 928.5 mg per dose. We noted a correlation between the patient's weight and the variation in medication dosage that arises when comparing the two different methods of dosing; $r(350) = 0.82$, $p < 0.001$. The regression was significant, $F(1, 350) = 742.18$, $p < 0.001$, with 67.2% of the variability in dose difference explained by the patient's weight. The average difference in dosage is 6.9 mg for each kilogram of the patient's weight. Furthermore, a linear regression analysis revealed that the patient's age is also a significant predictor of the dosage difference, $F(1, 350) = 150.12$, $p < 0.0001$, with age explaining 29.8% of the model. On average, the difference in paracetamol dosage differs by 1.5 mg for each additional month of patient age, ($p < 0.001$). **Expected Impact:** To optimize the dosing of OTC medications,

while enhancing the safety and accuracy of their dispensing, we propose utilizing supervised machine learning algorithms in conjunction with Growth Charts for Saudi Children and Adolescents. Additionally, integrating a weight-based dosing calculator into the national "Sehaty" app will improve the safety and accuracy of medication dispensing.

- Atallah H, Qureshi AZ, Nawaz S, **Wani T**. Complications of major lower limb amputations before prosthetic provision at a tertiary care rehabilitation facility. *Prosthetics and Orthotics International*. 2024 Dec 1;48(6):646-52.

Abstract

Background: Although postoperative complications of lower limb amputations and complications related to prosthetics are well known, complications before prosthetic fitting are less often emphasized in the literature. There are no Saudi studies documenting the complications before prosthetic fitting where there is a high rise in dysvascular amputation, and early prosthetic provision remains a challenge. **Objectives:** To investigate the complications following major lower limb amputations (MLLAs). **Methods:** One hundred thirty-six electronic files for individuals with major lower limb amputations were reviewed. Individuals visiting the primary limb loss clinic for the first time, who have not been fitted with a prosthesis before, were included. **Results:** Muscle weakness was the most common complication (55.1%), followed by edema (52.9%), while infection was found to be the least frequent (5.1%). Age was significantly associated with etiology (p-value < 0.001), usage of assistive devices (p-value = 0.002), and complications (p-value = 0.013). Complications were also significantly associated with time since amputation (p-value = 0.001). In addition, etiology was significantly associated with the usage of assistive devices (p-value = 0.012). **Conclusions:** Muscle weakness and edema were the most common complications after MLLA in a cohort of patients with a median onset of 8.5 ± 6.8 months since amputation. The presence of various complications in MLLAs before prosthetic evaluation reflects gaps in care including delayed prosthetic evaluation. National strategies need to be introduced to promote early rehabilitation interventions, prevent complications, and improve the quality of life of individuals with MLLAs.

- Ahmad Z. Qureshi, Hasan Shacfe, Mohammed Jameel, Waqas Sami, Imad S. Moukais, Fares Qannam, Lady Lynn Salazar Ortega, **Tariq Wani**. Qureshi et al. *Journal of the International Society of Physical and Rehabilitation Medicine* (2024) 00: e0045

Abstract

Objective: Challenges of patients with intrathecal baclofen pump therapy during the COVID-19 pandemic in Saudi Arabia **Background:** This study was carried out to analyze the effects of the COVID-19 pandemic on patients with intrathecal baclofen (ITB) therapy. **Methods:** Patients who came for ITB refill during the COVID-19 pandemic between March 2020 and August 2020 were contacted, and a survey was conducted regarding challenges faced during the COVID-19 pandemic. Data obtained from the chart review included demographics, diagnoses, pump information, baclofen dose, and COVID triage. Information was collected regarding travel arrangements, appointments, and problems related to ITB therapy or travel. The survey included 12 multiple-choice questions related to travel, appointment scheduling, and difficulties faced during the travel restrictions. **Results:** The study included 19 patients with ITB (mean age: 38.1 ± 14.4) from outside Riyadh city who came for an ITB refill during the COVID-19 pandemic. The majority of the patients were males. Spinal cord injury with paraplegia was the most common diagnosis (52.6%). In total, 7 patients had either clinical (31.6%) or travel-related difficulties (15.8%). No patient had ITB withdrawal at the time of

the clinic visit. Nearly half (47.4%) of the patients had to change their appointment for refill. The percentage of patients who used a car as a mode of travel pre-COVID was 42.1%, which increased to 78.9% during the pandemic. They traveled 747.4 ± 356.6 km (7.4 ± 3.7 h) to reach the hospital for refill. Patients needed 1–4 accompanied persons for assistance during travel, with the majority (68.4%) requiring 2 accompanied persons. Statistical analysis did not reveal any significant associations between clinical or travel difficulties and appointment changes. **Conclusions:** A pandemic or similar disaster can pose challenges to patients on ITB therapy living in areas with limited access to specialized care. In this study, none of the patients had serious complications or adverse outcomes; however, the main difficulties were attributed to travel. It is crucial to establish strategies at institutional, regional, or national levels to formulate guidelines for managing patients with ITB therapy during a pandemic.

- Ullah S, Qureshi AZ, AlWehaibi TA, Rathore FA, Sami W, Ayaz SB, AlKeid NH, Alibrahim MS, AlHabter AM, Alketheeri WB, **Bashir MS**. Functional priorities of individuals with spinal cord injury: A Saudi Arabian perspective. *Spinal Cord*. 2024 Sep;62(9):539-45

Abstract

Objective: People with spinal cord injury (SCI) are the deciding force behind the rehabilitation program to improve their quality of life (QoL) based on their personal preferences. Here we aimed to determine the preferences perceived most vital by Saudi SCI population to improve their QoL, and explore if these preferences are affected by gender, education, and duration, level, or extent of injury. **Design:** Participants ranked seven priorities of bodily functions as Rank I–VII with “I” being “Most important,” and “VII” being “Least important. **Setting:** Inpatient rehabilitation facility. **Participants:** 120 participants (>18 years of age) of either sex with SCI without polytrauma, acquired brain injury, neurodegenerative disease, and dementia. **Outcome measures:** Ranking scale of seven priorities of bodily functions as Rank I–VII with “I” being “Most important,” and “VII” being “Least important. **Results:** Of 101 individuals (mean age: 35.2 ± 14.8 years) finally included, 70.3% were males, 66.3% had onset of SCI since ≥ 3 years, 48.5% had a complete injury, and 75% had paraplegia. Most (26.7%) participants ranked walking as the first priority followed by hand/arm function (20.8%). Sexual function was the least important priority (39.6%). Hand/arm function was significantly more important for individuals with tetraplegia ($p < 0.001$). Trunk strength and balance was significantly less important for individuals with complete injury ($p = 0.037$). Participants with the onset of injury < 3 years and a complete injury reported bladder/bowel function as significantly more important ($p = 0.011$). Walking was significantly more important for people with incomplete injury and for people with injury duration ≥ 3 years ($p = 0.022$, $p = 0.002$ respectively). **Conclusion:** The top priority in our sample of Saudi people with SCI was walking followed by hand/arm function while the least desired function was regaining sexual function. Walking was a prioritized function for people with injury duration ≥ 3 years and people with a complete injury while hand/arm function was highly prioritized by people with tetraplegia

- Al-Hussaini A, Troncone R, Alobaid S, **Bashir MS**. Status of vitamins and minerals in children with screening-identified celiac disease: A case-control study. *Journal of Pediatric Gastroenterology and Nutrition*. 2024 Mar;78(3):677-84

Abstract

Objectives: Micronutrient deficiencies characterize classical “late-diagnosed” celiac disease (CeD). This study aimed to identify the prevalence of micronutrient deficiencies among children with “early-diagnosed” screening-identified CeD to determine the clinical value of routine testing for deficiencies in those patients.

Methods: A case-control study was conducted on screening-identified CeD patients diagnosed during a mass screening study (84 patients, mean age 11.3 ± 2.6 years). The controls (443 children, mean age 10.8 ± 2.5 years) were negative for celiac disease serological screening. Hemoglobin, serum levels of iron, ferritin, folate, vitamin B12, vitamin A, vitamin E, 25-OH vitamin D, zinc, and selenium were measured. **Results:** The mean serum levels of hemoglobin, iron, ferritin, vitamin D, zinc, copper, and selenium were significantly lower in CeD patients than in healthy controls (hemoglobin 12.56 vs. 13.02 g/dL [$p = 0.04$]; iron 10.61 vs. 17.6 $\mu\text{mol/L}$ [$p < 0.001$], ferritin 25.7 vs. 48.3 $\mu\text{g/L}$ [$p < 0.001$], vitamin D 29.1 vs. 37.5 nmol/L, zinc 11.9 vs. 21.7 $\mu\text{mol/L}$, copper 18.9 vs. 32.5 $\mu\text{mol/L}$, selenium 1.04 vs. 1.36 $\mu\text{mol/L}$; $p < 0.001$). Patients with celiac and severe intestinal damage (Marsh IIIb and IIIc) had significantly lower serum ferritin and vitamin A levels than patients with mild intestinal damage (Marsh II and IIIa) (ferritin 15 vs. 22 $\mu\text{g/L}$, $p < 0.025$; vitamin A 0.85 vs. 1.35 $\mu\text{mol/L}$, $p = 0.007$). **Conclusion:** Micronutrient deficiencies are still detectable in “early-diagnosed” screening-identified CeD cases, a clinically relevant result that strongly supports efforts for screening and early diagnosis of CeD.

RESEARCH SERVICES AND CLINICAL TRIALS ADMINISTRATION EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Adnan Ali S. AIMaghlooth (aalmaghlooth@kfmc.med.sa)	Director of Research Services Administration (KFMC/ R2)	Clinical trials	Observational research	Drug discovery policies, clinical practice guidelines	Periodontology oral implantology
Ms. Amani K. Abu Shaheen (aabushaheen@kfmc.med.sa)	Chairperson, Scientific Writing and Biostatistics Department	Epidemiology	Clinical research	Maternal and child health	Validity and reliability
Mr. Tariq Ahmed Wani (tawani@kfmc.med.sa)	Biostatistics Specialist I	Study design	Sample size determination	Statistics analysis plan	Data analysis
Mr. Mohammed Salman Bashir (mbashir@kfmc.med.sa)	Biostatistics Specialist I	Biostatistics	Clinical research	Survival analysis	
Ms. Shahed AIOtaiby (sotaiby@kfmc.med.sa)	Clinical Research Specialist I	Biomedical	Clinical research	Drug delivery	
Dr. Ahmad M. Saleh (asaleh@kfmc.med.sa)	Chairperson, Training & Education	Research	Infertility	Women's Health	
Ms. Maram AlShammari (msaalshammari@kfmc.med.sa)	Administrative Specialist I	Administrative support	Education	Courses and workshops	
Dr. Sharafaldein Bin Nafisah (sbinnafisah@kfmc.med.sa)	Chairperson, Clinical Research Department	Emergency Medicine/ EMS and Disaster	Biostatistics	Interventional and non-interventional studies	
Mr. Yosra AlJubran (yaljubran@kfmc.med.sa)	Clinical Research Specialist	Public health	Health Informatics	Clinical trials	Project management
Ms. Hadel Alsaran (halsaran@kfmc.med.sa)	Clinical Research Specialist	Lab	Clinical trials	Biomedical	
Ragdah Talal Kabli (rkabli@kfmc.med.sa)	Clinical Research Specialist	Pharmacy	Clinical trials	Health Informatics	

SATELLITE CLINICAL RESEARCH ADMINISTRATION

ORGANIZATIONAL CHART



Chief Executive Officer

**Executive Administration
of Research Center**

**Research Services & Clinical
Trials Administration**

Administrative Support

**Clinical Research Training
& Education Department**

**Scientific Writing & Biostatistics
Department**

**Clinical Research
Department**

Prepared by:

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Reviewed and Recommended by:

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Chairperson of Organizational Structure Committee
Riyadh Second Health Cluster

Approved by:

Dr. Fahad Saleh AlGhofaili
President
Riyadh Second Health Cluster

Riyadh Second Health Cluster
Research Center
Organization Chart
Number:42/281000 / 24/V1
Date:17 April 2024

The Satellite Research Administration was created to enhance research capacity by developing and supporting research groups, units, and departments within R2 hospitals, centers, and administrations.

The administration consists of the following departments:

1. Clinical Research Groups Department
2. Clinical Research Collaboration Department
3. Epidemiology and Public Health Research Department

CLINICAL RESEARCH GROUPS DEPARTMENT

Create clinical research groups from R2 hospitals and centers' researchers to provide an infrastructure for R2 researchers to brainstorm, share, advance, and produce ideas on research projects.

CORE FACILITIES

Clinical Research Groups provided very advanced study in functional MRI and scanned 64 patients for pre-surgical planning for brain tumors and epilepsy patients.

ACHIEVED PERFORMANCE INDICATORS

- Three IRFs were submitted
- Seven IRBs approved
- Ten published papers
- One submitted papers
- Four TFOs
- Six consultations in Neuroscience research
- Six proposals were submitted to RDIA
- Neuroscience Research Day
- 10 Residents/fellows were trained
- Trained 30 undergraduate students
- Five workshops
- Twelve lectures were conducted in the NNI MRI suit
- One Ph.D. student
- Three master students
- Abstract submitted to Biophysical Society conference
- Presentation CHOC conference at the University of California Irvine
- Talk in SNIH for research visibility and impact
- Provide 80 brain scans for neuroimaging studies to KFMC researchers
- Assist KFMC researchers with functional MRI post-processing (80 subjects)

AGREEMENT AND COLLABORATIONS WITH NATIONAL AND INTERNATIONAL INSTITUTIONS:

- Liverpool University
- New York University
- King Saud University
- KAIMRC
- Al-Qassim University



ONGOING PROJECTS

- Gray matter volume and cognitive performance during normal aging.
- Neurophysiological and motor behavioral effects of combining transcranial direct current stimulation (IDCS) and modified constraint-induced movement therapy (mCIMT) on upper limb function recovery in patients with stroke.
- Investigating the efficacy of combining virtual reality-based mirror therapy and transcranial direct stimulation to improve upper limb recovery in patients with stroke.
- The correlation between cognitive function and functional brain MRI in ADHD's patients.

EPIDEMIOLOGY AND PUBLIC HEALTH DEPARTMENT

The Epidemiology and Public Health Department (EPHD) mission is leading research, analytics, and professional networking that improves health and well-being through multidisciplinary epidemiologic and public health studies, across the spectrum of public health, clinical practice, and population health to generate evidence-based scientific data, leading to positive changes in policy and practice across clinical, public, and population health of important priority to a stakeholder in Saudi Arabia. More, bringing together policymaking, clinical practice, public, and population health management, through research, and research networking using epidemiology, statistics, economics, qualitative methods, and clinical science, by applying newly gained knowledge to reduce disease burden and cost, improve access to care, and outcome. Next, aid in transformation progress through critical data-driven decision-making (operational, financial, supply chain). Thus, supporting strategy progress, transformation, accountable care organizations, financial sustainability, operational progress, risk and challenges mitigation through funding, leadership support, human capital, and overall growth.

CORE SERVICES

- Lead practice-based national research.
- Maintain population health management-based disease registries.
- Epidemiology, public, and population outreach education conferencing and lecturing.
- Supervise and train research volunteers at the research center.
- Provide research methodology consultation for the family medicine department and others.
- National lead on lifestyle medicine therapeutic intervention research.
- National lead on Chronic disease interventional studies.
- National lead on chronic disease mapping.
- Professional academic writing and textbook authoring training.
- Collaborative research in CAM, nutrition, and Saudi Arabia determinants of illness and wellness.

ACHIEVED PERFORMANCE INDICATORS

- 12 Research awareness activities about services provided by EPHD staff.
- 8 Epidemiological studies initiated by EPHD staff.
- Initiated research groups.
- Kuwait Family Medicine Conference-Kuwait, speaker.

AGREEMENT AND COLLABORATIONS

The department has numerous research collaborations with various institutions and universities throughout Saudi Arabia, listed below:

RIYADH

- Primary healthcare centers of the First Health Cluster.
- Primary healthcare centers, and the family medicine department of R2.
- Primary healthcare centers of the Third Health Cluster.
- Saudi Health Council.
- Al-Faisal University College of medicine.
- Weqayah: Public health authority.
- King Saud University Family medicine department.
- National Center for Complementary and Alternative Medicine.
- Assistant Deputy Minister for Primary Health Care.

JEDDAH

- Samir Abbas Hospital.
- King Fahad Specialized Hospital.
- King Abdulaziz University.

ALQSSIM

- Sulaiman AlRajhi University.
- Endocrine and Diabetes Center.
- King Fahd Specialist Hospital, Burayah.
- King Saud hospital, Unayzah.
- The Salam Veterinary Hospital, Buraydah.

MADINAH

- Taibah University.
- Directorate of Health Affairs.
- Madinah health cluster.

HAIL

- Hail health cluster.
- Hail University.
- German Saudi Hospital.
- Directorate of Health Affairs.

JAZAN, TABUK

- Jazan University.
- Tabuk university

ONGOING PROJECTS

- High blood pressure mapping in Saudi Arabia, a pilot study.
- Diabetes type II mapping in Saudi Arabia, a pilot study.
- Pre-diabetes mapping in Saudi Arabia, a pilot study.
- Hyperlipidemia mapping in Saudi Arabia, a pilot study.
- Overweight and obesity mapping in Saudi Arabia.
- Intensive lifestyle intervention in diabetes type II in Saudi Arabia.
- Intensive lifestyle intervention in pre-diabetes in Saudi Arabia.
- Intensive lifestyle intervention in hyperlipidemia in Saudi Arabia.
- Intensive lifestyle intervention in obesity in Saudi Arabia.
- Intensive lifestyle intervention in high blood pressure type II in Saudi Arabia.

CONFERENCES

- Global Lifestyle Medicine Alliance, representing KSA lifestyle medicine, Global Lifestyle Medicine Leadership Forum Itinerary Doha, representing Saudi Arabia lifestyle Management-Qatar.
- The sixth Saudi global conference for occupational safety & Health, Speaker-Saudi Arabia.
- 2nd Kuwait International Family Medicine Conference-Kuwait, speaker.
- The Saudi Arabia International Conference on Lifestyle Medicine, conference/ organizing and scientific committee's Chairman-Saudi Arabia.
- 3rd International Lifestyle Medicine Conference-Korea, speaker.
- 20th International Symposium on Atherosclerosis-Oman, speaker.
- Cluster-2, KFMC Research Center 19th annual research conference scientific committee chairman and moderator
- Lifestyle Medicine Fellowship.
- Cluster-2 PHC research collaboration negotiations initiation.

CLINICAL RESEARCH COLLABORATION DEPARTMENT

The department supports multidisciplinary collaborations including collaboration between national and international academic and governmental institutions.

CORE FACILITIES

- To provide a link between centers and hospitals at R2 and Research Centre services.
- To encourage researchers at R2 to use the Research Centre services, manuscript writing, and statistics service and encourage researchers to apply for funding from the Research Centre.

ACHIEVED PERFORMANCE INDICATORS

- 3 National and International collaborations with hospitals and health institutions.
- Provided support to 57 external researchers.
- 16 Research Day Activities for Hospitals/Centers/Administrations.
- 8 CRC meetings per year for Hospitals and centers.
- 7 Meetings per year for Administration.
- 18 Hospitals/centers/Administrations active research committees.
- 20 Awareness activities.

PERIODIC ENCOURAGEMENT OUTCOMES

- 84 Research department engagement.
- 10 Central Research Committee engagement (RC and R2 transformation gate update).
- 40 Research Committees Engagement.

ENGAGEMENT COMMITTEES OUTCOMES

- 16 Research Days.
- 1 Guideline.
- 3 Training Course.

R2 RESEARCH LOGISTICS AND FACILITATION

- 25 Volunteers.
- 55 External Researchers.
- 6 Clinical Trial Coordinators access.
- 23 Research Supervisors (matched R2 supervisors for external researchers).



RESEARCH COLLABORATION STAFF INVOLVEMENT IN SCIENTIFIC RESEARCH AND ORGANIZATION PROCESS

- Organizing Committee members in 18 events.
- Scientific Committee Members in 6 events.
- Jury Committee members in 5 events.

RESEARCH DAYS

LIST OF CONDUCTED RESEARCH DAYS AT R2 2024



R2 Research Days 2024

21/01/2024	Lab Research Day	14/11/2024	Women Research Day
16/09/2024	Simulation Research Day	21/11/2024	Critical Care Unit Research Day
18/09/2024	EMA Research Day	28/11/2024	OMEC Research Day
25/09/2024	Pharmacy Administration	10/12/2024	AlYamamah Hospital
26/09/2024	Nursing	12/12/2024	Prince Mohammed Bin Abdulaziz Hospital
24/10/2024	King Salman Cardiac Center Research Day	24/12/2024	Main Hospital Research Day
05/11/2024	Children Specialized Hospital	24/12/2024	Family Medicine Research Day
07/11/2024	Rehab Research Day	25/12/2024	Al Majma'ah Hospital Research Day

AGREEMENT AND COLLABORATIONS

- Scientific writing 3 agreements on national level.
- Training and Education 2 Funding and 1 learning agreements on national level.
- Molecular Biology Lab 12 agreements with publication outcome. 9 on national level and 3 on international level.
- Clinical Research Groups 5 agreements with publication outcome. 3 on national level and 2 on international level.
- Grant Management Department 17 agreements with publication and funding outcome on national and international level.
- Precision Medicine Department 18 agreements 15 with publication and 2 PhD supervision outcome; 16 on national level and 1 on international level.
- Biobanking Department 9 agreements 8 with publication and 1 facility use agreements; 5 on national level and 4 on international level.
- Clinical Research Specialist II, Clinical Research Department, 12 publication agreements on 2 funding agreements on national level.
- Epidemiology and Public Health Department, 26 agreements on national level.

ONGOING PROJECTS

- Managing R2 External Researchers.
- R2 Research Awareness.
- R2 Research Days.
- Facilitate Research Agreements.

HIGHLIGHTED PUBLICATIONS

- **Alotaibi, A. M.,** Alosaimi, M. H., Alshammari, N. S., Orfali, R. S., **Alwatban, A. Z., Alsharif, R. A.,** Meyer, G. F., & Bentall, R. P. (2024). Exploring the relationship between hallucination proneness and brain morphology. *NeuroImage*, 304, 120942.

Abstract

Background: Hallucinations, including both auditory and visual forms, are often associated with alterations in brain structure, particularly in specific language-related cortical areas. Existing models propose different frameworks for understanding the relationship between brain volume and hallucination proneness, but practical evidence supporting these models is limited. **Methods:** This study investigated the relationship between hallucination proneness and brain volume in language-related cortical regions, specifically the superior temporal gyrus and Broca's area. A total of 68 participants, primarily university students, completed the Launay-Slade Hallucination Scale (LSHS) to assess hallucination proneness for both auditory and visual experiences. Structural MRI scans were used to measure brain volume in the targeted regions. **Results:** The results indicated significant positive correlations between LSHS scores and brain volume in the superior temporal gyrus and Broca's area regions previously linked to volume reductions in patients with clinically diagnosed hallucinations. Participants reporting high hallucination proneness for both auditory and visual hallucinations exhibited higher brain volumes in these language areas compared to those experiencing hallucinations rarely or never. **Conclusions:** These findings challenge existing models by suggesting that higher brain volumes in language-related cortical areas may be associated with increased proneness to both auditory and visual hallucinations in non-clinical populations. This contrasts with the volume reductions seen in patients with clinical hallucinations and highlights the need for further research into the complex interplay between brain structure and hallucinatory experiences.

- **Orfali, R., Alwatban, A. Z.,** Orfali, R. S., Lau, L., Chea, N., **Alotaibi, A. M.,** Nam, Y.-W., & Zhang, M. (2024). Oxidative stress and ion channels in neurodegenerative diseases. *Frontiers in Physiology*, 15, Article 1320086.

Abstract

Background: Numerous neurodegenerative diseases result from altered ion channel function and mutations. The intracellular redox status can significantly alter the gating characteristics of ion channels. Abundant neurodegenerative diseases associated with oxidative stress have been documented, including Parkinson's, Alzheimer's, spinocerebellar ataxia, amyotrophic lateral sclerosis, and Huntington's disease. **Methods:** Reactive oxygen and nitrogen species compounds trigger posttranslational alterations that target specific sites within the subunits responsible for channel assembly. These alterations include the adjustment of cysteine residues through redox reactions induced by reactive oxygen species (ROS), nitration, and S-nitrosylation assisted by nitric oxide of tyrosine residues through peroxynitrite. **Results:** Several ion channels have been directly investigated for their functional responses to oxidizing agents and oxidative stress. **Conclusion:** This review primarily explores the relationship and potential links between oxidative stress and ion channels in neurodegenerative conditions, such as cerebellar ataxias and Parkinson's disease. The potential correlation between oxidative stress and ion channels could hold promise for developing innovative therapies for common neurodegenerative diseases.

- Alshuhri, M. S., Alduhyyim, A., Al-Mubarak, H., Alhulail, A. A., Alomair, O. I., Madkhali, Y., Alghuraybi, R. A., **Alotaibi, A. M.,** & Alqahtani, A. G. M. (2024). Investigating the feasibility of predicting KRAS status, tumor staging, and extramural venous invasion in colorectal cancer using inter-platform magnetic resonance imaging radiomic features. *Diagnostics*, 14(2), 257.

Abstract

Background: Colorectal cancer is the third most common type of cancer with a high mortality rate and poor prognosis. The accurate prediction of key genetic mutations, such as the KRAS status, tumor staging, and extramural venous invasion (EMVI), is crucial for guiding personalized treatment decisions and improving patients' outcomes. MRI radiomics was assessed to predict the KRAS status and tumor staging in colorectal cancer patients across different imaging platforms to improve the personalized treatment decisions and outcomes. **Methods:** Sixty colorectal cancer patients (35M/25F; avg. age 56.3 ± 12.9 years) were treated at an oncology unit. The MRI scans included T2-weighted (T2W) and diffusion-weighted imaging (DWI) or the apparent diffusion coefficient (ADC). The manual segmentation of colorectal cancer was conducted on the T2W and DWI/ADC images. The cohort was split into training and validation sets, and machine learning was used to build predictive models. **Results:** The neural network (NN) model achieved 73% accuracy and an AUC of 0.71 during training for predicting the KRAS mutation status, while during testing, it achieved 62.5% accuracy and an AUC of 0.68. In the case of tumor grading, the support vector machine (SVM) model excelled with a training accuracy of 72.93% and an AUC of 0.7, and during testing, it reached an accuracy of 72% and an AUC of 0.69. **Conclusions:** ML models using radiomics from ADC maps and T2-weighted images are effective for distinguishing KRAS genes, tumor grading, and EMVI in colorectal cancer. Standardized protocols are essential to improve MRI radiomics' reliability in clinical practice.

- Alfuraih AM, **Alotaibi AM**, Alshammari AK, Alrashied BF, Mashhor YM, et al. (2024) Evaluating diagnostic accuracy and agreement of TI-RADS scoring in thyroid nodules: A comparative analysis between sonographers and radiologists. PLOS ONE 19(10): e0312121.

Abstract

Objective: The Thyroid Imaging Reporting and Data System (TI-RADS) is an essential tool for assessing thyroid nodules, primarily used by radiologists. This study aimed to compare the agreement of TI-RADS scores between sonographers and radiologists and to assess the diagnostic performance of these scores against histological findings in suspicious thyroid nodules. **Methods:** In a retrospective analysis, 168 patients with suspicious thyroid nodules classified as TR3 and above by the radiologists were included. Both sonographers and radiologists independently assigned the American College of Radiologists (ACR) TI-RADS scores, which were then compared for inter-reader agreement using Cohen's Kappa statistic. The scores were also evaluated for diagnostic performance against histological results based on the Bethesda system. **Results:** The study revealed a moderate overall agreement between sonographers and radiologists in TI-RADS scoring ($\kappa = 0.504$; 95% CI: 0.409–0.599), with poor agreement noted specifically for nodule margin scores ($\kappa = 0.102$; 95% CI: -1.430–0.301). In terms of diagnostic performance against histological outcomes, sonographers' TI-RADS scores showed a sensitivity of 100% and a specificity of 44.6%, while radiologists' scores showed a sensitivity of 100% but a lower specificity of 29.3%. **Conclusion:** The findings indicate moderate agreement in TI-RADS scoring between sonographers and radiologists, with reproducibility challenges especially in scoring nodule margins. The marginally superior diagnostic performance of sonographers' scores suggests potential efficiency benefits in involving sonographers in preliminary assessments. Future research should aim to encompass a wider range of TI-RADS categories and focus on minimizing scoring variability to enhance the system's clinical utility.

- **Alsharif, R.**, Abo Al-Azayem, S., Alsomali, N., Alsaheed, W., Alshammari, N., **Alwatban, A.**, Alrabae, Y., **Orfali, R.**, Alqarni, F., & Alrasheedi, A. (2024). Assessment of nurses' knowledge of the Glasgow Coma Scale in a Saudi tertiary care hospital: A cross-sectional study. Clinical and Translational Neuroscience, 8(4), 28.

Abstract

The Glasgow Coma Scale (GCS) is essential for assessing traumatic brain injury and predicting patient outcomes, yet studies indicate that nurses often have only a basic understanding of the GCS. In Saudi Arabia, research on this topic is limited, suggesting a need for improvement in nurses' GCS knowledge. This study aimed to evaluate the knowledge and proficiency of 199 staff nurses at King Fahd Medical City in Riyadh, Saudi Arabia, regarding GCS usage and to identify the factors impacting their competence. A descriptive, cross-sectional survey was conducted, and the data were analyzed using SPSS version 23.0. The results showed that 81.4% of nurses had an average level of GCS knowledge, with a mean score of 8.8 ± 1.826 . Only 13.6% demonstrated good knowledge, while 5% had poor knowledge. A significant correlation was found between GCS knowledge and nurses' departments ($\chi^2(2) = 19.184$, $p < 0.001$). The study concludes that GCS knowledge among nurses in this Saudi Arabian center is moderate, highlighting the need for continuous education programs to enhance their competence in GCS assessment.

- **Orfali, R.;** AlFaiz, A.; Alanazi, M.; Alabdulsalam, R.; Alharbi, M.; Alromaih, Y.; Dallak, I.; Alrahal, M.; **Alwatban, A.;** Saud, R. TRPV4 Channel Modulators as Potential Drug Candidates for Cystic Fibrosis. *Int. J. Mol. Sci.* 2024, 25, 10551.

Abstract

Cystic fibrosis (CF) is a genetic disorder caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene, resulting in defective chloride ion channels. This leads to thick, dehydrated mucus that severely disrupts mucociliary clearance in the respiratory system and triggers infection that eventually is the cause of death of CF patients. Current therapeutic strategies primarily focus on restoring CFTR function, blocking epithelial sodium channels to prevent mucus dehydration, or directly targeting mucus to reduce its viscosity. Among the ion channels expressed in ciliated bronchial epithelial cells, the transient receptor potential vanilloid 4 (TRPV4) channel emerges as a significant channel in CF pathogenesis. Activation of TRPV4 channels affects the regulation of airway surface liquid by modulating sodium absorption and intracellular calcium levels, which indirectly influences CFTR activity. TRPV4 is also involved in the regulatory volume decrease (RVD) process and enhances inflammatory responses in CF patients. Here, we combine current findings on TRPV4 channel modulation as a promising therapeutic approach for CF. Although limited studies have directly explored TRPV4 in CF, emerging evidence indicates that TRPV4 activation can significantly impact key pathological processes in the disease. Further investigation into TRPV4 modulators could lead to innovative treatments that alleviate severe respiratory complications and improve outcomes for CF patients.

- Aljohar HI, Nawawi RA, Albanyan NS, Aljarboa S, **Orfali RS.** An Assessment of aluminum contamination in neonatal parenteral nutrition solutions based on measured versus labeled content. *Saudi Pharmaceutical Journal* 2024; 32:101941.

Abstract

Aluminum can potentially cause toxicity in pediatrics and neonates receiving parenteral nutrition. Some PN solutions and ingredients in Saudi Arabia do not comply with US FDA regulations regarding aluminum exposure. This study aims to determine the aluminum concentration in samples of PN solutions and ingredients used to feed infants in Saudi Arabia. The aluminum in the samples was determined using inductively coupled plasma mass spectrometry. The concentration of metal contaminants in each sample was determined in triplicate. The aluminum content of 38 samples was investigated, 15 of which originated from components included in the prepared PN solutions. Among the 15 samples, the least measurable aluminum content was detected in potassium chloride solutions (0.81 mcg/L). In contrast, the greatest amount of aluminum was detected in potassium phosphate and calcium gluconate (141,64 mcg/L and 462.7 mcg/L), respectively. The results showed that the final PN solution (PNS) product contained more aluminum levels than the content ingredients; in addition, the study found a statistically significant relationship among 18 pediatric patients at KFMC who had intestinal failure and needed long-term parenteral nutrition. Specifically, their high aluminum levels, exceeding the normal range of 0.6 ng/ml, indicate that the current use of PN solutions will likely cause toxicity due to aluminum contamination in additives. Hence, reducing aluminum in PN solutions is imperative to ensure patient safety.

- Rahman, M. A., **Orfali, R.**, Dave, N., Lam, E., Naguib, N., Nam, Y.-W., & Zhang, M. (2023). KCa2.2 (KCNN2): A physiologically and therapeutically important potassium channel. *Journal of Neuroscience Research*.

Abstract

One group of the K⁺ ion channels, the small-conductance Ca²⁺-activated potassium channels (KCa 2.x, also known as SK channels family), is widely expressed in neurons as well as the heart, endothelial cells, etc. They are named small-conductance Ca²⁺-activated potassium channels (SK channels) due to their comparatively low single-channel conductance of about ~10 pS. These channels are insensitive to changes in membrane potential and are activated solely by rises in the intracellular Ca²⁺. According to the phylogenic research done on the KCa 2.x channels family, there are three channels' subtypes: KCa 2.1, KCa 2.2, and KCa 2.3, which are encoded by KCNN1, KCNN2, and KCNN3 genes, respectively. The KCa 2.x channels regulate neuronal excitability and responsiveness to synaptic input patterns. KCa 2.x channels inhibit excitatory postsynaptic potentials (EPSPs) in neuronal dendrites and contribute to the medium afterhyperpolarization (mAHP) that follows the action potential bursts. Multiple brain regions, including the hippocampus, express the KCa 2.2 channel encoded by the KCNN2 gene on chromosome 5. Of particular interest, rat cerebellar Purkinje cells express KCa 2.2 channels, which are crucial for various cellular processes during development and maturation. Patients with a loss-of-function of KCNN2 mutations typically exhibit extrapyramidal symptoms, cerebellar ataxia, motor and language developmental delays, and intellectual disabilities. Studies have revealed that autosomal dominant neurodevelopmental movement disorders resembling rodent symptoms are caused by heterozygous loss-of-function mutations, which are most likely to induce KCNN2 haploinsufficiency. The KCa 2.2 channel is a promising drug target for spinocerebellar ataxias (SCAs). SCAs exhibit the dysregulation of firing in cerebellar Purkinje cells which is one of the first signs of pathology. Thus, selective KCa 2.2 modulators are promising potential therapeutics for SCAs.

- Manal R. Alhamdan, Nouf M Aloudah and **Saleh Alrajhi**. Examining Physicians' Approaches to Treating Relatives in Primary Health Care Centers: Insights from a Qualitative Study. *Healthcare* 2024, 12,2021.

Abstract

Background: Family medicine physicians care for a diverse population of patients with various acute and chronic diseases. These patients include family, friends, and acquaintances who may ask for direct medical care or help in accessing healthcare products and services within or outside of officially approved procedures. This is ethically challenging due to an ambiguous medical code of ethics, but it is commonly accepted as normal behavior by society. This study aimed to explore family medicine physicians' perspectives regarding the benefits, difficulties, and ethics of responding to medical care requests and/or favors from family, relatives, friends, and acquaintances and to make recommendations. **Methods:** The study sample consisted of junior and senior family medicine physicians working in primary healthcare centers affiliated with the Ministry of Health in Saudi Arabia. In-depth semi-structured interviews were conducted to collect data. Using social exchange theory, this qualitative study explores how family medicine physicians perceive and handle requests for medical favors from family members and others. **Results:** Semi-structured interviews were conducted with 19 family medicine physicians (six focus groups) with clinical experience ranging from 3 to 20 years. The data analysis identified three themes: perceived benefits and costs of cultural and social connectedness,

in patient management and healthcare systems, and recommendations to address challenges between physicians and patients who are relatives. **Conclusions:** This study shows that treating others outside of normal access to healthcare services presents several ethical, moral, and professional challenges. Therefore, policy adaptation requires understanding this intricate dilemma and improving laws, system regulations, and guidelines for physicians and community members to improve access to care, reduce system abuse, empower providers, and enhance community awareness and compliance.

- Raha Orfali, Safina Ghaffar, **Razan Saud Orfali** et al. Anti-Bacterial Activity of an Ancient Remedy against Dermatological Infections, Natural Product Communication, 30 Dec 2024.

Abstract

Background: Skin and soft-tissue infections are among the most common infections and can develop severe local and systemic complications. Bacterial species: *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, and *Escherichia coli* usually cause skin infections. Studies of plants and natural materials used in ancient medicine to treat infections may assist us in further antibiotic discoveries. In this study, we tested the bactericidal activity of a 1,000-year-old Arabic Al-Razi remedy against common skin infections, and gram-positive and gram-negative bacterial strains. **Methods:** The agar diffusion method tested the antimicrobial activity; after adding a specific test sample, the zone of inhibition was measured. Minimum inhibitory concentrations (MIC) of Al-Razi full remedy, dropout batches, and single ingredients were performed by broth micro dilution assay. **Results:** The mixture of all ingredients of this remedy (vinegar, Arabic gum, *Boswellia*, vitriol, and aloe) has shown the highest antibacterial activity against *Staphylococcus aureus*, *Streptococcus pyogenes*, MDR *Pseudomonas aeruginosa* and clinical strains of *Pseudomonas aeruginosa*. However, the presence of a single ingredient in water has shown no activity against tested bacterial strains except vitriol. **Conclusion:** We found that when ingredients were dissolved in vinegar separately, they showed antibacterial activity, which shows that the antibacterial potential of this ingredient was enhanced by adding vinegar. A mixture of all ingredients showed the highest antibacterial potential. Therefore, a mix of natural ingredients for treating skin infections is likely to be more efficacious than using a single ingredient

SATELLITE RESEARCH ADMINISTRATION EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Adnan Al Watban (aawatban@kfmc.med.sa)	Director, Satellite Research Administration (KFMC/ R2)	MRI	Neuroscience	Biomedical Physics	
Dr. Habeeb Ali Saleh AlHabeeb (halhabeeb@kfmc.med.sa)	Chairperson, Research Collaboration Department	Obesity	Lifestyle medicine	Gut hormones	Appetite and contribute to weight maintenance
Ms. Hala Aljashi (haljishi@kfmc.med.sa)	Clinical Research Specialist	Health Science	Research Collaboration	Public Health	
Dr. Abdullah Alotaibi (amalotaibi@kfmc.med.sa)	Chairperson clinical research groups	Neuroimaging	MRI	Functional MRI	
Dr. Razan Orfali (rorfali@kfmc.med.sa)	Pharmacist II	Pharmacy	Neuropharmacology	Drug Discovery	
Ms. Roaa Alsharif (ralsharif@kfmc.med.sa)	Clinical researcher II	Research	Nursing	Clinical Leadership	

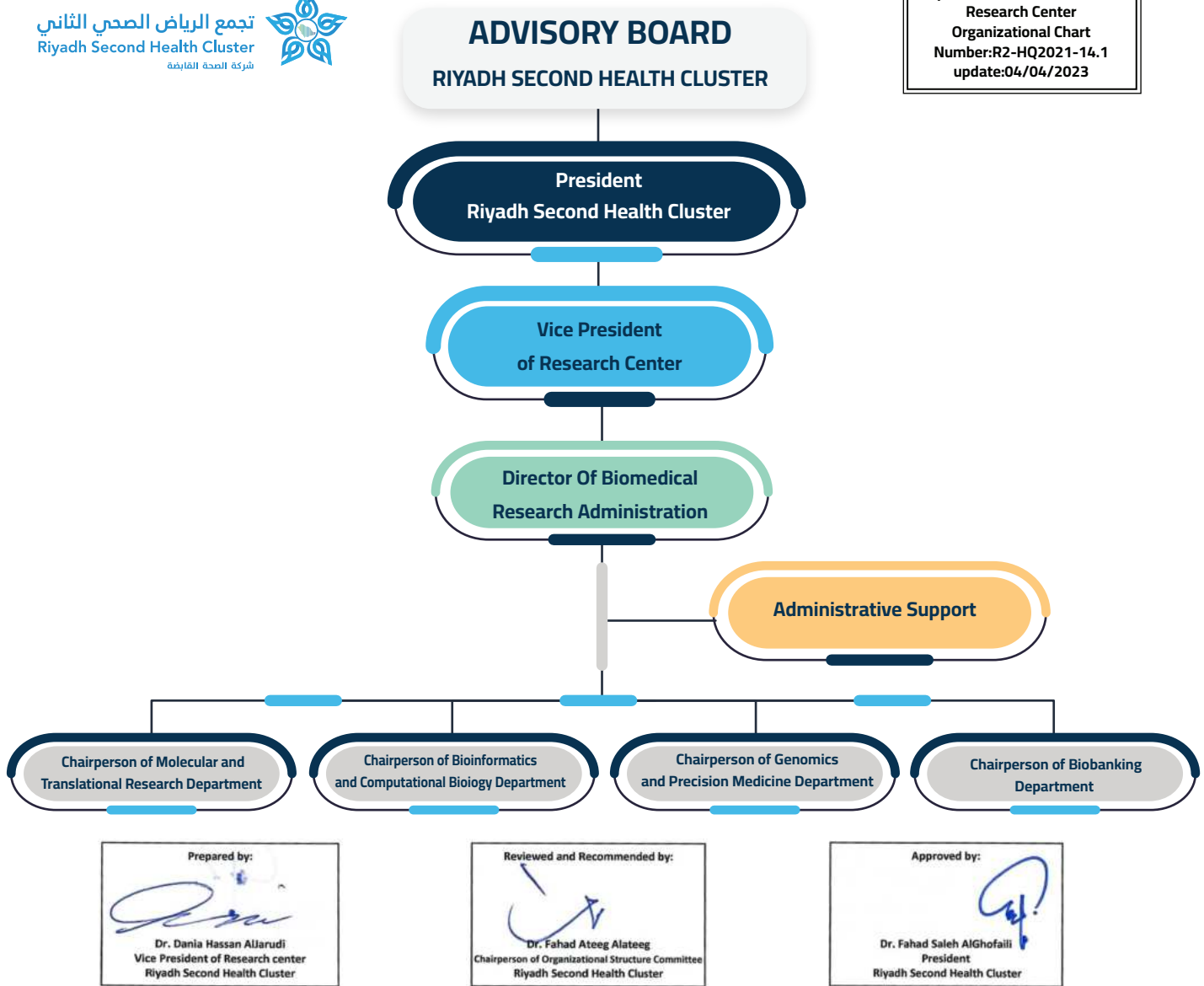


BIOMEDICAL RESEARCH ADMINISTRATION

ORGANIZATIONAL CHART



Riyadh Second Health Cluster
Research Center
Organizational Chart
Number:R2-HQ2021-14.1
update:04/04/2023



This administration assists and supports R2 clinicians and scientists in developing and conducting innovative biomedical research initiatives. The administration consists of the following departments:

- Biobanking Department.
- Molecular and Translational Research Department.
- Bioinformatics and Computational Biology Department.
- Genomics and Precision Medicine Department.

BIOBANKING DEPARTMENT



-80o C Freezer



The Biobanking Department is a major division of the Biomedical Research Administration. This department consists of two sections: Research Data Management (database management system), and Biological Specimen Banking (biobanking).

The Research Data Management is to improve the quality, productivity, and efficiency of medical research conducted at R2 using the CAISIS Data Management System. The system encourages researchers to develop disease databases and interrogate data within cohort studies, clinical trials, imaging, and genetic data together with patient records which offers excellent potential for the development of more effective diagnostics and therapeutics, identification of public health risks, and gaining new insights into health and diseases.

The department organized a course to train principal investigators on how to use CAISIS and delivered several talks to different hospitals and centers in R2.

The Biobanking section is a biospecimen management system that includes specimen processing, storage, and retrieval services. Biospecimen information is linked to the patient clinical information case report form, which is the hallmark of biobanking.

Biospecimen management system

Liquid Nitrogen tank



CORE SERVICES

- To improve the productivity and efficiency of the translational and clinical research conducted at R2 through the use of a unified platform (database) that integrates data within cohort studies or disease registries, including clinical, imaging, and genetic data, together with patient records.
- To offer great potential to develop more effective diagnostics and therapeutics, identify public health risks, and gain new insights into health and diseases.

ACHIEVED PERFORMANCE INDICATORS

INFRASTRUCTURE

- Fresh Breast and Colorectal Tissues Biobank.
- Developed an informed consent for Biobanking, approved by IRB.
- Allocated room for Liquid Nitrogen (LN) and LN tanks.
- 2 Fridges, 2 Freezers with barcoded system for each freezer.
- 1 Biosafety Cabinet.
- Developed standard operation procedure for LN
- Labeling and tracking system.
- Developed SPP for Biobank.

EDUCATIONAL AND RESEARCH ACTIVITIES

- Invited speaker by world health organization (WHO) to the Quadripartite Global Technical Meeting on MERS-CoV and Other Emerging Zoonotic Coronaviruses.
- Big Data: Coronaviruses at Multiple Scales” Workshop.
- CRC Program.
- Princess Norah University Training Program Students.
- King Saud University Training Program Students.
- Proteomics in Medicine.
- A public talk: Emerging and Re-Emerging Infectious Diseases.
- Polymerase Chain Reaction as a powerful tool in the diagnosis of COVID-19.
- Basic Pediatric Residency Course.
- Advanced Pediatric Residency Course.
- Supervision Master's and Ph.D. students.
- Histology training.
- EPIC training.
- Co-supervising 5 Ph.D. students from the University of Liverpool, United Kingdom.
- Members in reviewing panels of many journals.



AGREEMENT AND COLLABORATIONS

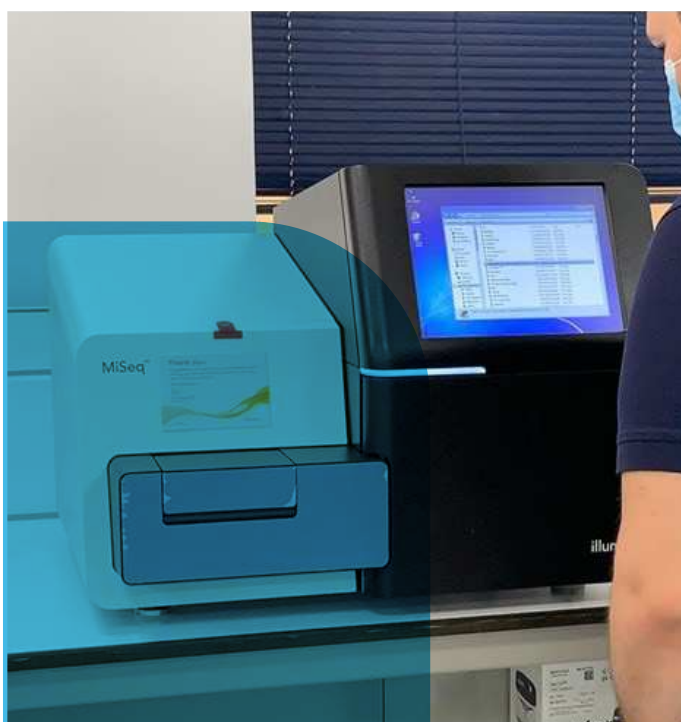
- Qatar Biobank.
- University of Liverpool.
- Cambridge University.
- Oxford University.
- King Abdullah University of Science and Technology.
- Agency for Science, Technology, and Research (A-STAR).
- King Abdulaziz University.
- Al-Qassim University.
- United States-Food and Drug Authority.
- Coalition for Epidemic Preparedness Innovations (CEPI).
- King Saud University.
- Imam Mohammad Ibn Saud Islamic University.
- Princess Nourah Bint Abdulrahman University.
- Alyamamah Hospital.
- ELI LILLY company.
- UK-ICN.

ONGOING PROJECTS

- Research Base for Severe Coronavirus Infection for The Rapid Characterization of These Viruses in Humans and Systems for Medical Countermeasure Development and Evaluation.
- Investigation of IL-6 Action Mechanism in Eliciting Inflammation in Covid-19 Patients.
- Prevalence of Common Respiratory Viruses in Children at A Tertiary Care Hospital in Saudi Arabia.
- Expression Signature and Prognostic Relevance of Immune Checkpoint Molecules in Human Papillomavirus-Driven Cancers.
- Seroprevalence of Hepatitis A in Blood Donors from Saudi Arabia.
- Molecular Evidence for a Causal Suspect Role of Oncogenic Viruses in Human Breast Cancer Using Transcriptomic Expressions of Viral Oncogenes and Their Effect on Human Tumor Suppressor Genes.
- Advanced NSCLC Cases in Saudi Arabia: A Six-Year Cross-Sectional Study.
- Differences in Clinical, Epidemiological, and Pathological Features of Breast Cancer in Saudi Population a Single Institution Study.
- Characterization of The Immune Microenvironment in Hepatocellular Carcinoma in Saudi Arabia.

BIOINFORMATICS AND COMPUTATIONAL BIOLOGY DEPARTMENT

The need for Bioinformatics and Computational Biology (BCB) services increased over the past decade due to technological proliferation that generates biological data and the move toward carrying out translational research projects. The Bioinformatics and Computational Biology Department's main function is to provide Bioinformatics and Computational Biology services through the Research Center for scientific research projects that are geared to improve healthcare services within R2. The main aim within the Bioinformatics and Computational Biology department is to expand its infrastructure to accommodate the needs of entities within the R2 about Computational Biology and Bioinformatics services. Furthermore, the BCB department is striving to commercialize its services to external entities as a revenue point for R2.



CORE SERVICES

Technology and data platform

- Provision of secure data management and storage solutions for large-scale biological datasets.

Clinical Data analysis and support

- Assistance in computational biological data analysis.

Consultation services:

- Bioinformatics and computational biology consultation on best approach and practices for the analysis of biologic genomics and proteomics, and pipelines optimization
- Provision of scientific support to scientific researchers through methodology consultations and data analytics services.

- Guidance on regulatory compliance and ethical consideration for utilizing clinical and biomedical data in research.

Research infrastructure

- Supporting/Expanding computational infrastructure to accommodate future researchers within R2.

Research projects

- Produce high-value scientific research in the field of bioinformatics and computational biology.

Knowledge transfer and training

- BCB Knowledge transfer and dissemination to scientific researchers and the community to enhance scientific outlook and output.

ACHIEVED PERFORMANCE INDICATORS

- Complement the Research Center's educational activities with Bioinformatics and Computational Biology week in the CRC program.
- 4 Research Studies supporting the BCB department infrastructure.
- 3 Studies utilizing BCB infrastructure Services.
- 29 Consultation Services to R2 researchers.
- 13 Awareness Activities.
- 10 BCB Outreach/Promotional Activities.
- 3 BCB Scientific Research Published Studies.
- 5 Approved IRBs for BCB Initiated Research

AGREEMENT AND COLLABORATIONS

- King Saud University Medical City.
- King Faisal Specialist Hospital and Research Center.
- Swiss Institute of Bioinformatics.
- Imam Mohammad Ibn Saud Islamic University.
- University of Lausanne Switzerland.
- Northern Border University.
- Open Biological and Biomedical Ontologies (OBO) Foundry – European Bioinformatics Institute.
- Princess Nourah Bint Abdulrahman University.
- King Abdulaziz University.

ONGOING PROJECTS

- Obesity Diagnosis, Treatment, and Financial Impacts in Riyadh's Second Health Cluster Hospitals.
- Leveraging Ontologies for Variant Classification and Decision Support Systems.
- Fine-Grained Healthcare Data Access Control and Cyber Threats Prevention Using Graph Databases.
- Employing Text Mining Through Machine Learning in Healthcare Digital Transformation.
- Comparative Effectiveness of Telemedicine vs. In-Person Diabetes Management in Saudi Arabia.
- Data-driven approach to reducing diabetes-related compliance and hospitalization.

MOLECULAR AND TRANSLATIONAL RESEARCH DEPARTMENT



The Molecular and Translational Research Department is one of the divisions under the Biomedical Research Administration that promotes and encourages R2 researchers to develop and conduct innovative biomedical research initiatives either in basic medical science or translational medical research.

There are three research laboratories located on the fourth floor of the Faculty of Medicine. These

laboratories are fully equipped with state-of-the-art equipment/instruments to provide an outstanding healthy and safe environment of support for researchers to conduct their research. The Molecular lab (MC4-020) is dedicated mainly to infectious disease research and is equipped with Genetic Sequencer, Fluoro-Spectrophotometry, as well as Real-Time and conventional Polymerase Chain Reaction techniques.

The Biochemistry (MC4-018) and General lab (MC4-019) are equipped with cutting-edge technologies such as atomic absorption Spectroscopy, ultrahigh-performance liquid chromatography, high-performance liquid chromatography, Analytical Flow Cytometry, Agilent Technologies Cary 60 UV-Vis, as well as Enzyme-Linked Immunosorbent Assay (ELISA) and protein purification equipment. Our laboratories are also equipped with all necessary and updated supplementary equipment such as; shaker incubator, refrigerated and unrefrigerated centrifuges, vortexes, cell counter, water bath and dry incubator, shakers ...etc. Our labs also house entirely isolated 2 cell culture facilities that are equipped to conduct any molecular and cell biology procedures.



CORE FACILITIES

- To provide a wide range of experimental research services that would promote and prioritize research proposals of clear translational potential.
- To translate innovative research outcomes into actionable healthcare interventions and clinical practices that will eventually improve public health and patient outcomes.

ACHIEVED PERFORMANCE INDICATORS

- 13 Published papers in medical journals.
- 12 translational studies funded by IRF and fully initiated by Biomedical Laboratory staff.
- More than 35 ongoing translational research projects are being conducted at the research labs.
- 76 Trainees/Volunteers from different national institutions.
- Organized the 3rd Translational Research Summer Course.



Agreement and Collaborations



Prof Jincun Zhao
Shanghai Institute for Advanced
Immunochemical Studies,
ShanghaiTech University



Dr Abeer Alshukairi, MD
Infectious Disease consultant at King Faisal
Specialist Hospital and Research Center. She is
also a professor of Medicine at Alfaisal University.



Daniel Douek, M.D., Ph.D.
National Institutes of Health, National Institute
of Allergy and Infectious Diseases (NIAID)
Chief, Genome Analysis Core
Chief, Human Immunology Section



Professor David Veesler
Professor of Biochemistry



Dr. Hadi Mohamad Yassine
Professor of infectious diseases



Dame Sarah Gilbert DBE FRS
Professor of Vaccinology



Ongoing department projects

NO.	PRIMARY-INVESTIGATOR	STUDY TITLE
1	Mr Abdullah Alrasheed	The Role of chemokines and pattern-recognition receptors in the immunopathogenesis of MERS-CoV infection: Gene Expression Profiling of Pulmonary Innate Immunity
2	Dr. Fawziya Barnawi	Humoral and Cellular Immune Durability of Different COVID-19 Vaccine Platforms Following Homologous/Heterologous Boosters: One-Year Post Vaccination.
3	Dr. Saad Alamri	Expression signature and prognostic relevance of immune checkpoint molecules in human papillomavirus-driven cancers
4	Mr Sultan al-qahtani	Molecular Diversity of Human Gastrointestinal Viruses in Riyadh region
5	Mr. Haitham Alkadi	Identification of Potential Liver Cancer Biomarkers in Diabetic Patients through Investigation of Biological Effects of Advanced Glycation End Products on Cancer Cell Surface and Cytoplasmic Protein Expression
6	Dr. Maaweya Elaeed	Human Papillomavirus-Associated Cervical Cancer and Immune Escape: The Role of the Tumor Microenvironment Transcriptome in Patients' Prognosis and Disease Progression
7	Dr. Maaweya Elaeed	Impact and association of hematological factors and genetic disorders among asymptomatic individuals infected with blood-borne viruses (HBV, HCV, and HIV) and risk factors in Saudi Arabia: A multi-year large national study
8	Dr. Bandar Alosaimi	Design of an Epitope-Based Peptide Viral Vaccine Candidate Using Reverse Vaccinology Approach; Preclinical evaluation of efficacy, immunogenicity, and safety in an animal model
9	Ms. Hadel Alsaran	The role of the tumor microenvironment transcriptome of redox genes in Hepatitis Virus-Associated Hepatocellular Carcinoma (HCC)
10	Mr. Haitham Alkadi	Long non-coding RNAs gene signature in pediatrics and adults with acute and severe respiratory syncytial virus infection: integrating in vivo experimental and computational models.
11	Mr. Saad Alamri	Determining molecular evidence for a causal suspect role of Mouse Mammary Tumor Virus (MMTV) in human breast cancer using transcriptomic expressions of viral oncogenes and their effect on human tumor suppressor genes.
12	Ms Hadeel Alnajran	Design of a Multi-Epitope Vaccine Against Human Respiratory Syncytial Virus (hRSV) Using a Computational Biology Approach: Evaluation of Immunogenicity, Antigenicity, Allergenicity, and Toxicity
13	Mr. Halah Alrawi	Expression profiling and prognostic utility of autophagy-related genes and proteins in Epstein–Barr virus-associated malignancies
14	Dr. Muawiyah Hamza	Genomic Surveillance of Dengue Virus in Jazan City, Saudi Arabia Using Nanopore Sequencing: Insights into Viral Evolution and Public Health implications

15	Ms. Ebtehal A. Alsolm	Identification of S100A4 binding partners in acute myeloid leukemia
16	Ms. Ebtehal A. Alsolm	Investigating the function and regulation of Genetic Suppressor Element 1 (GSE-1) with histone deacetylase I (HDAC1) in hepatocellular carcinoma
17	Dr. Muawiyah Hamza	T regulatory cells and type 2 diabetes.
18	Dr. Muawiyah Hamza	Study of the influence of mutations on the structural aspects and physical characteristics of G-6-PD variants using Molecular Dynamic approach
19	Ms Rahaf Henawi	Human Leukocyte Antigen (HLA) and Epstein–Barr Virus (EBV)-Associated Nasopharyngeal Carcinoma: The Role of HLA Genotypes in Patients' Prognosis and Disease Progression
20	Dr. Muawiyah Hamza	Identification of S100A4 Binding Partners in Acute Myeloid Leukemia
21	Dr. Maaweya Elaeed	Dynamics and reprogramming of immunity of COVID-19 disease and/or COVID-19 vaccination in MERS-CoV survivors: Zooming in from Non-trained immunity to trained and hybrid immunity
22	Dr. Nimah Alsomali	Cytokine profile in Saudi multiple sclerosis patients and its relationship with disease disability.
23	Ms. Hajar Alshehri	Characterization of exposure to viruses of pandemic potential through serosurveillance in people in the Kingdom of Saudi Arabia before and after completing the Hajj pilgrimage
24	Dr. Abdullatif Bin Khunayn	Evaluating the Immunogenicity and Effectiveness of the HPV Vaccine in Preventing HPV-Related Diseases.
25	Ms. Ghida Almurished	Comparative Study of Antimicrobial Resistance Patterns in Gram-Positive and Gram-Negative Pathogens in Saudi Arabia: National Six-Year Retrospective Study
26	Ms Amjad Al Sahli	Mapping the Landscape of HPV: Molecular Epidemiology and Phylogenetic Analysis of Infection Rates in Women
27	Dr Reham Alahmadi	Profiling the Tumor Immune Microenvironment of HPV-associated Rectum Squamous and Adeno Cell Carcinoma
28	Dr Bandar Alosaimi	Developing a Human-Derived Immune Modulators as Innovative Mucosal Adjuvants for HRSV Peptide Vaccines: Comparative Analysis of different vaccination strategies
29	Ms. Fatoon Alkhelaiwi	Epidemiology Trends and Multidrug-Resistant Klebsiella pneumoniae Isolates in a Tertiary Hospital in Riyadh, Saudi Arabia: A Five-Year Retrospective Study
30	Ms. Raghd Altamimi	Molecular Profiling of T-helper Immune Genes in the Human Papillomavirus-Associated Cervical Cancer Patients

NEW INFRASTRUCTURE

Introducing new research lab platforms:

- Renewal of two software's annual licenses we have at our data analysis room: (1) sequencher (lifetime license); (2) Prism (annual); (3) Biorender (annual).
- Adding new supplementary instruments to our labs:
 - Received new ABI Rt/qPCR Machine from KFMC Lab.
 - 4°C Lab refrigerator was acquired from KFMC Chemistry Labs.
 - NUPCO order:
 - o Flow Cytometer BD FACS Lyric
 - o Freezer -86°C
 - o Microscope Fluorescence
 - o Sequencer MiSeq
 - o Immunoassay Multiplexing
 - o Elispot / Fluorospot Reader
 - o CO₂ Incubator

CAPACITY BUILDING

Capacity-building initiatives are designed to strengthen the skills and capabilities of staff within the Molecular and Translational Research Department. Currently, we are implementing several projects that focus on enhancing expertise across various domains, including scientific research, postgraduate supervision, and advanced technical skills. We aim to foster a culture of excellence and innovation, ensuring that our department remains at the forefront of research and translates findings into impactful solutions.

SUPERVISING PHD AND MASTER STUDENTS

Currently, we are supervising 5 exceptional Ph.D. students and one Master's student who are conducting cutting-edge research in disease mechanisms, host-pathogen interactions, vaccine development, antiviral strategies, molecular diagnostics and biomarkers, tumor microenvironment, and cancer immunity signaling pathways. These students receive scientific training, and mentorship from our experienced staff, and have access to state-of-the-art research facilities. Through close supervision and guidance, our goal is to develop their research skills, foster critical scientific thinking abilities, and expand their advanced knowledge. We aim to prepare them to become future scientists in the biomedical field and to make a positive impact on society.

IRF FUNDED PROJECTS

We have successfully secured funding for 13 research projects. These projects cover a range of subjects and address critical challenges and emerging areas in the molecular and translational field.

SAUDI NATIONAL INSTITUTE OF HEALTH (NIH)

We have submitted five research projects to the NIH. These projects reflect our dedicated efforts to enhance our understanding of infectious diseases and cancers, and vaccine development, as well as to develop innovative strategies for diagnosis and treatment.

DEPARTMENT INITIATIVES AND STRATEGY PROJECTS

VACCINE BIOTECHNOLOGY INITIATIVE

The Vaccine Biotechnology Initiative focuses on the development of innovative viral vaccine candidates to combat infectious diseases. This initiative employs cutting-edge computational techniques for multi-epitope vaccine design, aiming to assess the immunogenicity, antigenicity, allergenicity, and toxicity of the proposed vaccine constructs. This initiative seeks to design an epitope-based peptide viral vaccine candidate, followed by comprehensive preclinical evaluations to ensure its efficacy, safety, and immunogenicity in animal models.

1. Development of a Novel Peptide-Based Viral Vaccine Candidate Using Reverse Vaccinology and Computational Immuno-Bioinformatics: Preclinical Evaluation of Efficacy, Immunogenicity and Safety in Vitro and Animal Model.
2. Multi-Epitope Vaccine Against Human Respiratory Syncytial Virus (RSV) Using Computational Methods: Preclinical evaluations to assess efficacy, immunogenicity, and safety in Mice models.

These studies aim to pave the way for robust and effective vaccines that can significantly reduce the burden of respiratory viral infections.

VIROLOGY JOURNAL CLUB

The Journal Club activity is one of the activities under the Virology and Vaccine Biotechnology Research Group. The group purpose is to connect R2 experts to conduct clinical and translational research on all aspects of infectious diseases research including viral immunology, vaccinology and viral oncology.

This activity was conducted 9 times during 2024. The speaker presents a published paper on viral host interaction, emerging and reemerging infectious diseases, biotechnology and vaccine development, and molecular studies on virus evolution.

TOWARDS HIGH IMPACT TRANSLATIONAL RESEARCH QIC PROJECT

We conducted a comprehensive review of all IRF-funded research projects between 2022 and 2023 (n=91) and all 2023 R2 published works (n=443), focusing on their impact on patient care. From this analysis, we selected 10 IRF-funded projects that demonstrated a significant impact on patient care. We then conducted interviews with the principal investigators (PIs) of these selected projects to provide guidance on project progression and implementation.

CONFERENCES AND EXTERNAL TRAINING

- The 26th Annual Conference of the European Society for Clinical Virology, Frankfurt, Germany.
- Global Health Exhibition
- CPHI Middle East

GENOMIC AND PRECISION MEDICINE RESEARCH DEPARTMENT

Our distinctive genetic compositions bestow upon us unique attributes. These genetic disparities, when coupled with the influence of our environmental exposures, can significantly shape our responses to medical treatments and the progression of various disease states. Nevertheless, the alarming surge in the prevalence of diseases such as cancer, cardiovascular disorders, pulmonary ailments, and metabolic imbalances within our nation underscores the urgent demand for cutting-edge research. This underscores the pressing need for advanced personalized medicine research. The Genomics and Precision Medicine Department is part of the Research Center at KFMC-R2 was established to serve patients, physicians, and all relevant medical and research community in the Kingdom of Saudi Arabia.

Our research focus is in the field of cancer, microbiome, cardiovascular and metabolic disorders, hereditary diseases, drug discovery and targeted therapeutics. We offer wide range of basic and advanced techniques in our labs all of which includes DNA/RNA extraction, PCR, cell culture, flow cytometry, western blotting, microarray SNP analysis, oncomine NGS, gene panel NGS and High-performance liquid chromatography (HPLC).

CORE FACILITIES

- To create the foundation for personalized medicine in the kingdom to accelerate the pace of healthcare innovation
- To build a Saudi human genome database for disease prediction and prevention.
- To build infrastructure and capacity in the rapidly advancing field of genomics and precision medicine.
- To create a knowledge base of gene variants, both normal and disease-causing to build more effective therapeutic strategies.
- Apply integrated multi-omics research approach (Genomics, Transcriptomic, Proteomics, and Metabolomics) to accelerated cancer biomarkers discovery.

ACHIEVED PERFORMANCE INDICATORS

- Successfully submitted eight (IRB) applications for genomic and drug delivery studies.
- Five research projects are funded through the King Fahad Medical City (KFMC) and collaborative projects with various institutions, including King Saud University (KSU), Princess Nourah bint Abdulrahman University (PNU), and the King Abdulaziz City for Science and Technology (KACST).
- More than 13 junior researchers and trainees, including residents and fellows, have been trained to date.
- Published six papers in high-impact factor journals, achieved through collaborations with various national and international partners.
- Developed approximately six research projects aimed at enhancing service lines and models of care.
- Actively participated in ten educational lectures, awareness activities, and workshops focused on genomics and drug discovery.
- The total number of research studies conducted through collaborations with national and international scientific institutions is 8. This includes partnerships with King Saud University (KSU), Princess Nourah bint Abdulrahman University (PNU), King Abdullah University of Science and Technology, King Khaled Eye Specialist Hospital, King Faisal Specialist Hospital & Research Center, Albaha University, and Pfizer.

ONGOING PROJECTS

- Development of different anti Tyrosine Kinase Receptors for the treatment of different type of cancer.
- The use of a novel peptide to deliver cytotoxic molecules to tumor sites.
- Study the Effects of Fisetin on Gene Expression and DNA Methylation of Cancer-Related Genes in Different Colorectal Cancer Cell Lines
- The Role of hnRNP proteins in AML.
- The Genetic Landscape of Neuroblastoma in Saudi Arabia
- Solidified self-nanoemulsifying drug delivery system of cabozantinib malate for the treatment of hepatocellular carcinoma.
- Investigating the function and regulation of Genetic Suppressor Element 1 (GSE-1) with histone deacetylase I (HDAC1) in hepatocellular carcinoma.
- Emerging Health Threat from Multidrug-Resistant *Acinetobacter baumannii* in the Riyadh Region, Saudi Arabia.
- Role of Human Cytomegalovirus (HCMV) in the carcinogenesis of high-grade gliomas and Medulloblastoma as a therapeutic target.
- Multidrug-Resistant *Staphylococcus Capitis*: An Emerging Challenge in Clinical Settings Found in Adult Patients in Saudi Arabia.
- Prevalence of Medulloblastoma tumors adults VS children in Saudi Arabia.
- The concurrence of pituitary adenoma among MS patients at KFMC.
- Identification of S100A4 Binding Partners in AML.



BIOMEDICAL RESEARCH ADMINISTRATION HIGHLIGHTED PUBLICATIONS

- Chandran. S., Louis, N. E., Amran, S. I., Ab Latif a, N., **Hamza, M. A.**, Alonazi, M. (2024) Computational analysis of dimer G6PD structure to elucidate pathogenicity of G6PD variants. Biomedicine.

Abstract

An inherent genetic enzyme disorder in humans, known as glucose-6-phosphate dehydrogenase (G6PD) deficiency, arises due to specific mutations. While the prevailing approach for investigating G6PD variants involves biochemical analysis, the intricate structural details remain limited, impeding a comprehensive understanding of how different G6PD variants of varying classes impact their functionality. This study examined the dynamic properties of G6PD wild types and six G6PD variants from 23 different classes using molecular dynamic simulation (MDS). The wild-type and variant 24 G6PD structures unveil high fluctuations within the amino acid range of 274–515, the structural NADP⁺ binding site, pivotal for enzyme dimerization. Specifically, two variants, G6PDZacatecas (R257L) and G6PDDurham (K238R), demonstrate compromised structural stability at the dimer interface, attributable to the disruption of a salt bridge involving Glu 206 and Lys 407, along with the disturbance of hydrogen bonds formed by Asp 421 at the β N- β N sheets. Consequently, this impairment cascades to affect the binding affinity of crucial interactions, such as Lys 171-Glucose-6-Phosphate (G6P) and Lys 171-catalytic NADP⁺, leading to diminished enzyme activity. This study underscores the utility of computational in silico techniques in predicting the structural alterations and flexibility of G6PD variants. This insight holds promise for guiding future endeavors in drug development targeted at mitigating the impacts of G6PD deficiency.

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- **Alamri S**, Badah MZ, Zorgi S, Alenazi R, Alshanbari HM, Ali MAM, Murished G, **Awadalla ME**, Alshihre A, Alghareeb WA, **Alosaimi B**. Disease prognosis and therapeutic strategies in patients with advanced non-small cell lung cancer (NSCLC): a 6-year epidemiological study between 2015–2021. Transl Cancer Res 2024.

Abstract

Lung cancer is the top cause of mortality in males and the second largest cause of cancer-related fatalities in women worldwide. Non-small cell lung cancer (NSCLC) cases are discovered at an advanced stage, raising major challenges in disease management and survival outcomes. This study aimed to investigate the clinical findings and management of stage IIIB and IV NSCLC patients for better decision-making, disease management, and understanding of this fatal disease. In this cohort study of 340 patients, a total of 140 (41.2%) were diagnosed with advanced-stage NSCLC at a mean age of 64 years. The electronic data of patients from 2015 to 2021 who met the inclusion criteria were retrieved from two tertiary hospitals in Riyadh, Saudi Arabia, and an Excel sheet was used to record the variables. Patients' data including all categorical variables such as gender, stage, metastasis, ALK, EGFR, and ROS, etc., and continuous variables such as age and body mass index (BMI) were retrieved and analyzed. The multivariate Cox-regression model indicated that smoking was the significant risk factor of death for two-thirds of male smokers (37.9%), with a median survival time of 123 days. Disease progression was higher with pleural and brain metastasis, and localized metastasis was the highest in 75% of patients. The intent of treatment was mainly palliative, however, a statistically significant association was found with the simultaneous use of chemotherapy and immunotherapy. Patients' response to first-line treatment revealed a significant improvement if chemotherapy treatment was maintained at the same dose without interruption of dosage. The overall cure and survival rates for NSCLC remain low, particularly in metastatic disease. Therefore, continued research into new drugs and combination therapies is required for better decision-making to expand the clinical benefit to a broader patient population and to improve outcomes in NSCLC.

- Yahya Maashi, Shaykhah Almutairi, Maram Aldawood, Hamad Al-Eidi, Rehab AlRoshody, Hind A Alghamdi, Sara Bahattab^{1,3}, Abdulmonem A Alsaleh, **Haitham Alkadi**, Saleh Alghamdi, Bader Almuzzaini, Sabine Matou-Nasr In Vitro Oncogenic Effects of Glycated Albumin in Human Colorectal Cancer Cell lines HT29 and SW620 Revealing EpCAM and Galectin-3 Upregulation in Type 2 Diabetic Colorectal Cancer Tissues as Potential Biomarkers

Abstract

Glycated albumin (GA), an advanced glycation end product (AGE), is highly generated in patients with type 2 diabetes mellitus (T2DM), and associated with the increased development and progression of colorectal cancer (CRC). However, the biological effects of GA on colorectal adenocarcinoma and metastatic CRC pathogenesis remain unclear. Here, we investigated the impact of methylglyoxal-derived GA on colorectal adenocarcinoma HT29 and metastatic CRC (mCRC) SW620 cell lines, to explore key cellular events involved in oncogenesis. Using a cell viability assay and Transwell inserts, GA stimulated CRC cell proliferation, migration and invasion, compared to the untreated cells. Western blot technology and protein arrays indicated that GA increased the phosphorylation levels of oncogenic extracellular signal-regulated kinase (ERK)1/2 and ribosomal protein kinase p70S6K1. Additionally, the gene and protein expression of epithelial cell adhesion molecule (EpCAM), glycan-binding protein Galectin-3 (Gal-3) and RAGE, the main receptor for AGEs, were upregulated by GA. Bioinformatics analysis confirmed the increased expression levels of EpCAM, Gal-3 and p70S6K1 genes in tissues of T2DM CRC patients compared to their non-diabetic counterparts. Using an anti-RAGE neutralizing antibody, the RAGE blockade prevented GA-induced ERK1/2 phosphorylation, EpCAM and Gal-3 overexpression in CRC cells. Throughout the study, the non-glycated albumin had no effect. Altogether, GA might contribute to the pathogenesis of colorectal adenocarcinoma and mCRC via GA-RAGE axis, leading to the upregulation of EpCAM and Gal-3, revealed as promising biomarkers for the early diagnosis of CRC development and progression in patients with T2DM.

- **Alosaimi B**, Fallatah DI, Abd ElHafeez S, Saleeb M, Alshanbari HM, **Awadalla M**, Ahram M, Khalil MA. Predictors of Human Papillomavirus (HPV) Vaccine Acceptability Among Physicians, Their Knowledge on Cervical Cancer, and Factors Influencing Their Decision to Recommend It. J Multidiscip Healthc. 2024;17:5177-5188

Abstract

In Saudi Arabia, the HPV vaccine is administered to young females through school-based immunization programs; however, the program's efficacy depends on parental consent, with physicians acting as primary determinants in parental decision-making regarding HPV vaccination. In this cross-sectional study, we recruited 128 physicians and assessed their knowledge and attitudes toward cervical cancer, HPV, and the HPV vaccine, and unraveled predictors of HPV vaccine acceptability and factors that would influence the recommending of the vaccine. Although the major factor that influenced recommending the vaccine negatively was the fear of vaccine side effects, a positive influence of the physician's reading (91%), recommendations from colleagues (88%), and government directives (87%) provided reassurance and increased confidence in recommending the vaccine. Longer clinical experience and institutional awareness were found to be a predictor of favorable recommendations of HPV vaccination. Physicians in vaccine-related medical specialties with more than 4 years of experience were 5 to 6 times more likely to have positive attitude and better knowledge regarding HPV and HPV vaccination. A notable finding was that participants who reported knowing a woman suffering from cervical cancer had more positive attitudes compared to those who did not. This study identified physicians' personal reading, peer recommendations, and government directives as factors affecting the physicians' decision to recommend HPV vaccine, and found that longer clinical experience and institutional awareness were predictors influencing physicians to recommend the vaccine. It also emphasizes on the influence of healthcare providers in promoting the HPV vaccination and the need for designing interventions

targeting specific demographic and professional groups that would be more effective in improving better knowledge and promoting positive attitudes towards these critical public health issues.

- Alshamrani S, Kumar A, **Aldughaim MS**, Alghamdi KM, Hussain MD, Alanazi FK, Kazi M. Development of Polymeric Micelles for Combined Delivery of Luteolin and Doxorubicin for Cancer Therapy. *Journal of Cancer*. 2024 Jul 8;15(14):4717.

Abstract

Luteolin (LUT) is a bioactive compound with several pharmacological activities including anticancer effect. Doxorubicin (DOX) is an anthracycline chemotherapeutic drug that have proven to be effective in treating various types of cancers. Polymeric micelles (PMs) containing biologically active materials have emerged as prospective dosage forms with high drug loading, which can add therapeutic benefit to poorly water-soluble compounds and novel chemical entities. PMs are effective in delivering several drugs, such as anticancer drugs, antifungal drugs, flavonoids and drugs targeting the brain. The aim of the current study is to develop PMs for LUT and DOX as a combined delivery system for cancer therapy. Methods: PMs were prepared using 2.5% of each of LUT and DOX with varying compositions of Poloxamer 188, Poloxamer 407, Vitamin E (TPGS), Poloxamer 123 and Gellucire 44/14 at room temperature. Particle size, polydispersity index, zeta potential, were achieved using Zetasizer Nano particle size analyzer and the sizes were further confirmed with transmission electron microscopy (TEM). Prepared PMs were further characterized using powder X-ray diffraction (PXRD) and fourier transform infrared spectroscopy (FTIR). An MTT assay was performed on breast cancer (MCF-7) cells and liver cancer (HepG2) cells to determine the cytotoxic effect of the different PMs formulations. Results: PMs were successfully developed and optimized using 74.3% Poloxamer 407 with 20.7% Vitamin E (TPGS), and 70% Poloxamer 407 with 25% Gellucire 44/14, respectively. The droplet size and polydispersity index were found to be 62.03 ± 3.99 nm, 91.96 ± 5.80 nm and 0.33 ± 0.05 , 0.59 ± 0.03 , respectively for PMs containing TPGS and Gellucire 44/14. Zeta potentials of the PMs containing TPGS and Gellucire 44/14 were recorded as -2.27 ± 0.11 mV and -7.78 ± 0.10 mV, respectively. The PMs showed a spherical structure with approximately 50-90 nm range evident by TEM analysis. The PXRD spectra of PMs powder presented the amorphization of LUT and DOX. The FTIR spectra of LUT-loaded and DOX-loaded PMs were identical, suggesting consistent PMs composition. The MTT assay showed that the representative combined drug loaded PMs treatment led to a reduction in the viability of MCF-7 and HepG2 cells compared to drug free PMs and pure LUT, DOX alone. Conclusions: PMs with LUT and DOX exhibited significant cytotoxic effects against breast and liver cancer cells and could thus be an important new pharmaceutical formulation to treat cancer

- Habibullah MM, Hurubi A, Hakamy AO, Alwadani AA, Atti IM, Alothaid H, Shamlan G, **Aldughaim M**, Kaabi YA, Alhazmi A, Hamali H. The Association Between Antioxidant Enzyme Polymorphisms with Type 2 Diabetes Mellitus in Jazan Province. *Diabetes, Metabolic Syndrome and Obesity*. 2024 Dec 31:4593-8.

Abstract

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by persistent hyperglycemia, which results in initiates oxidative stress and disrupts various cellular pathways. In this study, we examined the relationship between polymorphisms in antioxidant enzymes, specifically glutathione peroxidase 1 (GPx1) and catalase (CAT), and the susceptibility to T2DM in a Saudi population from the Jazan Province. Methods A total of 419 participants were evaluated, including 247 T2DM patients and 172 controls. They were genotyped for the GPx1 Pro198Leu and CAT-262C/T polymorphisms by a PCR-based method. Results The results indicated that individuals with the CAT T/T genotype had a 60% lower likelihood of developing T2DM compared with those harboring the C/C genotype (uOD 0.4; 95% CI 0.2–0.8, $p = 0.04$); however, no significant association was



observed between the GPx1 polymorphism and T2DM. Discussion The results suggest that CAT polymorphism may confer a protective effect against T2DM, whereas the GPx1 polymorphism appears not to be a determinant of T2DM susceptibility in this population. Further studies including larger and more diverse cohorts are necessary to validate these results and elucidate the underlying mechanisms. Understanding the genetic factors that contribute to T2DM is essential for developing targeted preventive and therapeutic strategies.

- Kulmanov M, Tawfiq R, Liu Y, Al Ali H, Abdelhakim M, Alarawi M, Aldakhil H, Alhattab D, **Alsolme EA**, Althagafi A, Angelov A. A reference quality, fully annotated diploid genome from a Saudi individual. *Scientific Data*. 2024 Nov 23;11(1):1278.

Abstract

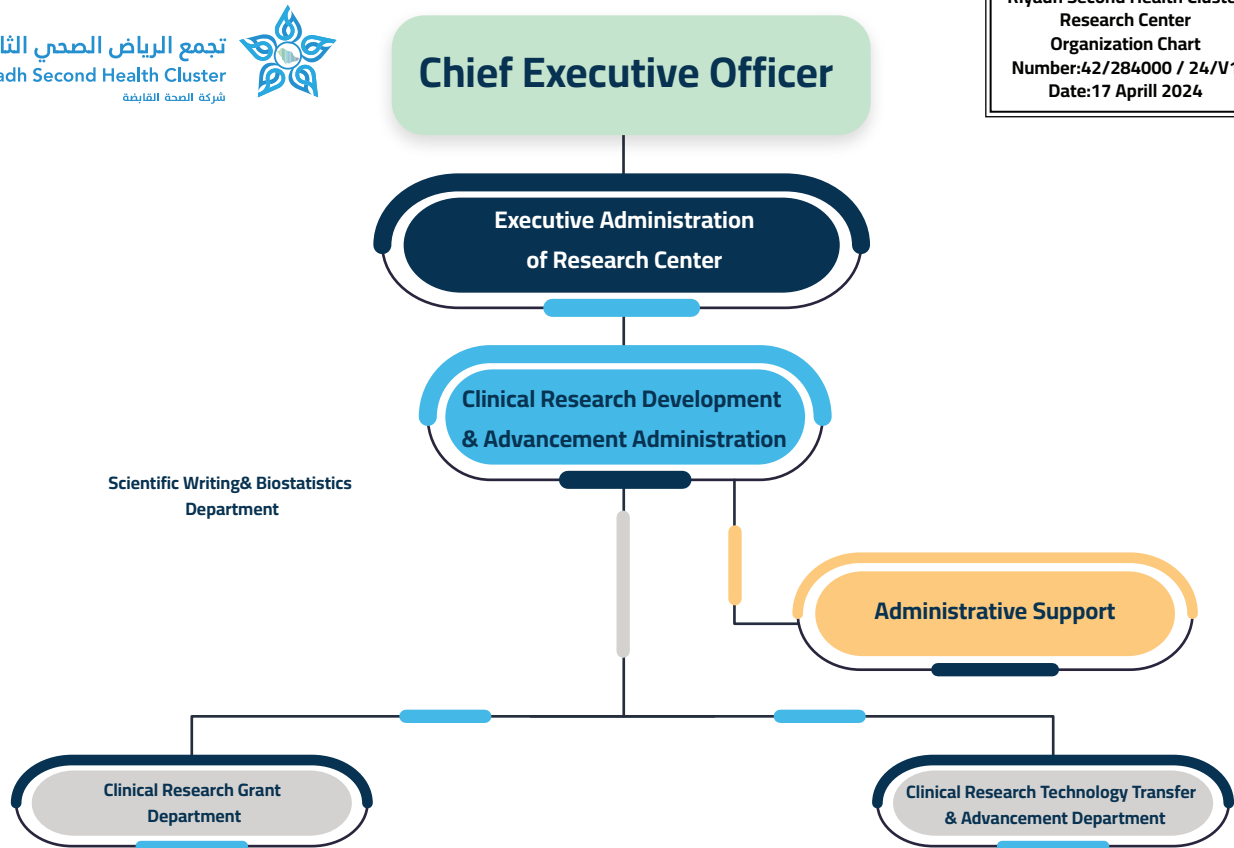
We have used multiple sequencing approaches to sequence the genome of a volunteer from Saudi Arabia. We use the resulting data to generate a de novo assembly of the genome, and use different computational approaches to refine the assembly. As a consequence, we provide a contiguous assembly of the complete genome of an individual from Saudi Arabia for all chromosomes except chromosome Y, and label this assembly KSA001. We transferred genome annotations from reference genomes to fully annotate KSA001, and we make all primary sequencing data, the assembly, and the genome annotations freely available in public databases using the FAIR data principles. KSA001 is the first telomere-to-telomere-assembled genome from a Saudi individual that is freely available for any purpose.

Biomedical Research Administration Expertise

Name	Position	Specialization Area Keywords			
Dr. Muaawia Ahmed Hamza (mahahmed@kfmc.med.sa)	Director, Biomedical Research Administration	Protein biochemistry	Biomarkers	Enzyme activity	- Academic integrity - Medical Education
Dr. Bandar AIOsaimi (balosaimi@kfmc.med.sa)	Chairperson, Research Laboratory Department	Virology	Molecular Biology	Sequencing	Biotechnology
Dr. Maaweia Elaeed Hamed Awad Alla (mawadalla@kfmc.med.sa)	Senior Clinical Research Specialist	Virology	Immunology	Vaccinology	Molecular Biology
Ms. Hadeel Alsarani (halsaran@kfmc.med.sa)	Clinical Research Specialist	Molecular Biology	Hepatitis	Flow Cytometry	Western Blotting
Mr. Haitham S. Alkadi (halkadi@kfmc.med.sa)	Clinical Research Specialist I	Cancer	Hepatitis	Microarray	Sequencing
Dr. Nawal S. Alshammari (nalshammari@kfmc.med.sa)	Chairperson, Biobanking Department	Genetic oncology	Genetic oncology Neuro-oncology and bioinformatics	Women's Health	
Dr. Emad Husni Omar Kutbi (ekutbi@kfmc.med.sa)	Clinical Research Specialist I	Cancer	Leukemia	Biobank	
Dr. Leen AbuSafieh (lsafieh@kfmc.med.sa)	Clinical Research Consultant	Molecular Genetics	Inherited genetic disorders	Next Generation Sequencing NGS	Ocular Genomics
Mr. Saad AlAmri (Salamri@kfmc.med.sa)	Clinical Research Specialist	Histology	Tissue	Biobank	
Dr. Mohammed AIDhugaim (maldugaim@kfmc.med.sa)	Chairperson of Genomic and precision medicine research department	Tumors Targeted Therapie	Drug Delivery Systems	Cellular and Molecular Medicine	Drug Discovery
Afnan Alsharm (aaalsharm@kfmc.med.sa)	Research specialist II	Biotechnology & Genome	DNA and RNA extraction and quantification, cell culture techniques.	Biomedical Science	Genomics
Ms. Ebtehal A. Alsolm (ealsolme@kfmc.med.sa)	Clinical Research Specialist	Molecular genetics	Biomedical Science	NGS platform, NGS bioinformatics, Tissue culture	Personalized medicine
Dr. Ali A. AlFaiz (aalfaiz@kfmc.med.sa)	Chairperson, Bioinformatics and Computational Biology Department	Bioinformatics	Next Generation Sequencing NGS Data analysis	Omics	High-Performance Computing (HPC)
Dr. Dalia Alghamdi (daaalghamdi@kfmc.med.sa)	Clinical Research Specialist	Bioinformatics	Genomic standards	Biobank knowledge engineering	Genomics data federation

CLINICAL RESEARCH DEVELOPMENT AND ADVANCEMENT ADMINISTRATION

ORGANIZATIONAL CHART



Riyadh Second Health Cluster
Research Center
Organization Chart
Number:42/284000 / 24/V1
Date:17 April 2024

The Clinical Research Development and Advancement Administration (CRDAA) within the Research Center at Riyadh's Second Health Cluster is responsible for the oversight and management of clinical research grants, ensuring effective allocation of resources to support both internal and external research projects. It ensures compliance with regulatory standards, optimizes the utilization of budgets, personnel, and infrastructure, and drives the successful execution of research initiatives. Additionally, the administration leads and facilitates the dissemination of clinical research findings, promotes knowledge-sharing, and supports the transfer of clinical research outcomes into healthcare application to further the impact of clinical research projects and improve healthcare at R2. The administration consists of the following departments:

- Clinical Research Grant Department
- Clinical Research Technology Transfer and Advancement Department

CLINICAL RESEARCH GRANT MANAGEMENT DEPARTMENT

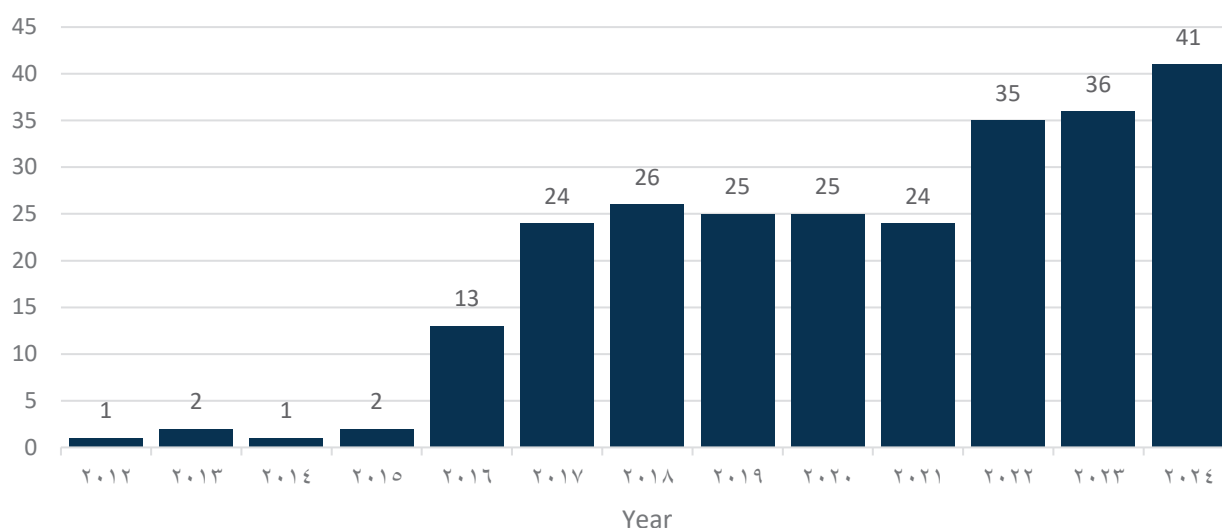
The Clinical Grant Management Department (GMD) is responsible for providing financial support to R2 researchers to enhance research productivity.

CORE SERVICES

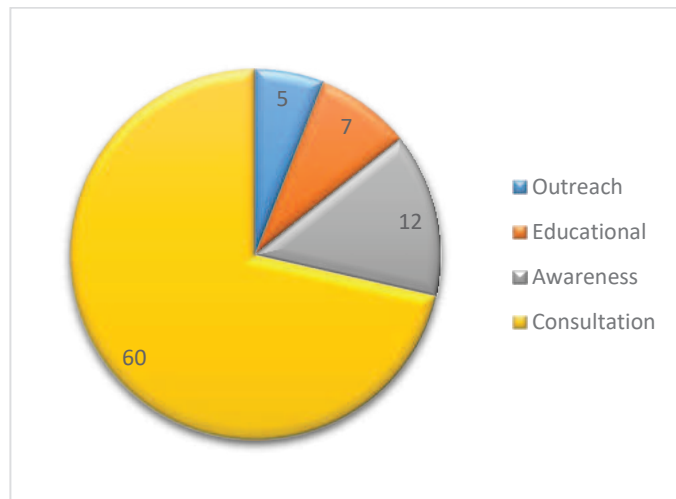
- Providing financial support to R2 researchers on a competitive basis, to facilitate the conduct of research and to enhance research productivity.
- Review all intramural funding applications through a standardized and efficient process of peer review.
- Broadcasting all upcoming internal and external grant opportunities within R2.
- Oversee the efficient and appropriate use of grant funds.
- Assist R2 researchers with extramural fund submission.
- Provide training workshops, one-to-one consultation on all aspects of the submission process, grant writing proposals, budgeting criteria, and updated policies.

ACHIEVED PERFORMANCE INDICATORS

- 41 Publications from the IRF projects.
- 35 Projects were funded by GMD.
- 3,455,038.47 SAR is the total amount of allocated funds for research proposals.
- 3,167,989.29 SAR released for IRF-approved proposals.
- 2 Project funded by international external funding agencies.
- 879,724.68 SAR is the total amount of funds from external research agencies.
- 84 research educational, awareness, outreach, and consultation activities were given.
- 60 consultation sessions were provided.



Number of published IRF studies per year.



Consultation and educational activities.

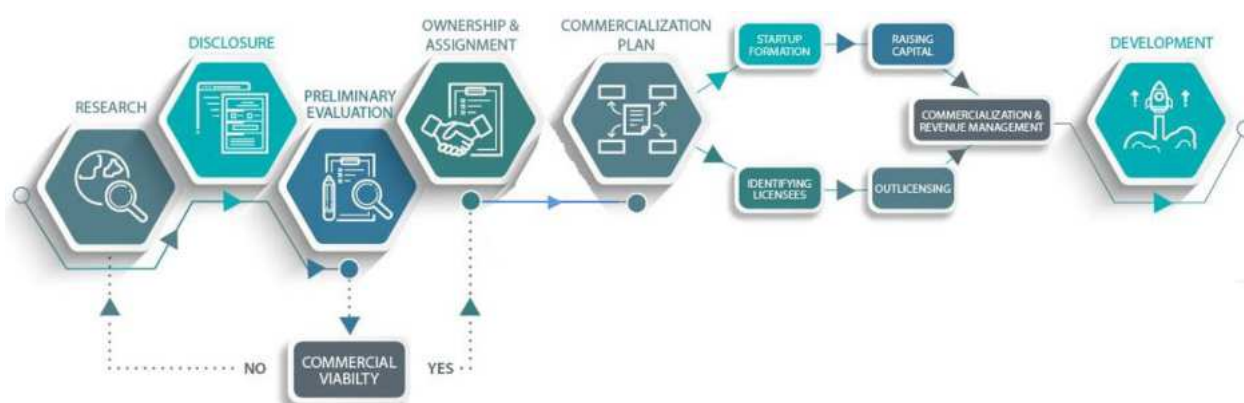
AGREEMENT AND COLLABORATIONS

- GMD keeps updating the external review panel regularly.
- GMD contacted 90 external reviewers' experts and highly competent in their respective fields.

GMD COLLABORATES WITH 13 INSTITUTIONS FOR THE PEER-REVIEW PROCESS:

- King Abdullah International Medical Research Centre.
- King Saud Bin Abdul-Aziz University.
- Taif University.
- King Khalid University.
- King Abdul-Aziz University.
- Jazan University.
- Prince Sultan Military Medical City.
- Al-Faisal University.
- King Abdullah University of Science and Technology.
- King Faisal Specialist Hospital and Research Centre.
- Ministry of the National Guard.
- Al-Baha University.
- Imam Abdulrahman Bin Faisal University.

CLINICAL RESEARCH TECHNOLOGY TRANSFER AND ADVANCEMENT DEPARTMENT



The Clinical Research Technology Transfer and Advancement Department is dedicated to bridging the gap between research advances and patient care. We are actively seeking research-based methodologies, technologies, or applications that have the potential to be adapted or retargeted for use in clinical settings. This department is responsible for overseeing the transfer, integration, and continuous advancement of Clinical technologies within KFMC and R2. Its main goal is to ensure that new or external technologies are successfully adopted, implemented, and improved for the benefit of the organization through the provision of high grade healthcare services.

CORE SERVICES

- Technology Transfer Management.
- Technology Evaluation and Assessment.
- Ensures Training and Knowledge Transfer.
- Implementation and Integration Support.
- Continuous clinical research Improvement and Advancement.
- Commercialization of the technologies.

ACHIEVED PERFORMANCE INDICATORS

- As a newly established department in 2024, we have attracted three new projects and started assessing them.
- Applied for a Strategic project titled “Building a Disease Registry for Rare Disease Mendelian Disorders in Riyadh Second Health Cluster”.
- Published four papers in high impact journals.
- Attended two conferences.
- Have one local collaboration.

INFRASTRUCTURE

- Established new CPP.
- Established new Standard Operating Procedures (SOPs).
- Established new departmental checklist forms for technology evaluation.

ONGOING PROJECTS

- Consumable Store Management and Control.
- Injectable material alternative for knee surgery and bone implantation.
- Software for nutrition intake.
- Identification of Potential Liver Cancer Biomarkers in Diabetic Patients through Investigation of Biological Effects of Advanced Glycation End Products on Cancer Cell Surface and Cytoplasmic Protein Expression.
- Long non-coding RNAs gene signature in pediatrics and adults with acute and severe respiratory syncytial virus infection: integrating in vivo experimental and computational models.

HIGHLIGHTED PUBLICATIONS

- Awadalla DM, AL Rawi H, Henawi RA, Barnawi F, **Alkadi H**, Alyami A, Alsughayir A, Alsaif AS, Mubarak A, Alturaiki W, Alosaimi B. Humoral and Cellular Immune Durability of Different COVID-19 Vaccine Platforms Following Homologous/Heterologous Boosters: One-Year Post Vaccination. *Frontiers in Immunology*.;16:1526444.

Abstract

The durability of Hybrid immunity induced by natural infection and/or COVID-19 vaccines and evidence supporting further booster vaccination are crucial factors for pandemic response, yet remain poorly understood. Here, we measured the durability of immune response and neutralizing capacity of antibodies following Homologous/Heterologous vaccination by mRNA-based vaccines (Pfizer-BioNTech BNT162b2) or (Moderna mRNA-1273) and viral vector-based vaccines (ChAdox1 nCoV-19-Oxford-AstraZeneca) in infected and non-infected patients. We also evaluated the long-lasting specific humoral IgG levels and T-cell immunity of the Memory CD8 cells. We compared the two groups and found that the heterologous prime boosters induced significantly higher IgG antibody levels)9.09(compared to their homologous counterparts)5.236) at one-year post-vaccination. We measured SARS-CoV-2 anti-S IgG antibodies and then assessed their neutralizing capacity to inhibit the receptor-binding domain (RBD) of the SARS-CoV-2 wild-type strain and omicron B.1.1.529/ BA.2 variants from binding to the ACE2 receptors. The heterologous regiment demonstrated superior ACE2-binding inhibition and consistently had higher mean ACE2-receptor binding inhibition across all dose regimens without the need for further doses. The CD8+ T cells producing IFN- γ to various COVID-19 vaccine dose regimens were evaluated. We found that robust T cell-mediated immune responses were preserved and largely induced by a heterogeneous vaccination eliciting a significantly higher CD8+ T cells IFN- γ response in 100% of vaccinees regardless of previous natural infection. Indeed, the difference between infected and naïve groups was less pronounced suggesting a reduced infection-related response. Overall, across three layers of evidence, the clinical significance of this study identified that heterologous vaccination would result in a renewed durability that endures for a longer time than the period of immunity conferred by homologous doses regardless of previous natural infection.

- Alyami A, AlJurayyan A, Alosaimi B, **Alkadi H**, Alkhulaifi F, Al-jurayb H, Osman A, Christmas S, Alomar S, Al-Bayati Z. The correlation between soluble human leukocyte antigen (sHLA-G) levels and+ 3010 polymorphism. *International Journal of Immunogenetics*. 2024 Feb;51(1):39-46.

Abstract

Human leukocyte Antigen-G (HLA-G) is classified as non-classical HLA, located in the short arm of chromosome 6 and composed of seven introns and eight exons. The HLA-G gene has a lower frequency polymorphism in the coding area and higher variability at the regulatory 5'- and 3'-untranslated regions linked to HLA-G microRNA regulation. HLA-G molecule is known to have an immunomodulatory and tolerogenic features role. In 199 Saudi individuals, we examined the association between plasma soluble HLA-G (sHLA-G) levels and eight polymorphic different sites, including 14 bp ins/del/+3003T -C/+3010C-G/+3027C-A/ +3035C-T/+ 3142C-G/+3187A-G/+3196C-G single nucleotide polymorphisms (SNPs) in exon 8 in the HLA-G gene. Our results revealed higher frequency for rs17179101C (97%), rs1707T (92%) and rs9380142A (73%) alleles. Greater frequencies for the tested genotypes were observed in 3027C/C (rs17179101) (93%), 14 bp (rs1704) ins/del (92%), +3003T/T (rs1707) (85%) and +3035C/T (rs17179108) (79%) SNP genotypes. Moreover, we observed a significant association of sHLA-G with +3010G/C (rs1710) SNP. In conclusion, we showed a significant association between 3010G/C (rs1710) SNP and the sHLA-G level among our sample for Saudi populations. Our findings demonstrated that specific SNP within the HLA-G gene is linked to sHLA-G molecule secretion, suggesting sHLA-G levels may be regulated genetically.

- Naeem A, **Alkadi HS**, Manzoor MU, Yousaf I, Awadalla M, Alturaiki W, AlYami AS, Zafar A, Alosaimi B. Mutations at the conserved N-Terminal of the human Rhinovirus capsid gene VP4, and their impact on the immune response. *Journal of Immunoassay and Immunochemistry*. 2024 Mar 23:1-21.

- **Abstract**

Rhinoviruses (RV) are the major cause of chronic obstructive pulmonary disease and are associated with exacerbation development as well as community-acquired pneumonia in children, leading to substantial morbidity, mortality, and hospital admission. Here we have examined how changes at the amino terminal of the conserved VP4 epitope of different RV serotypes may affect pulmonary cytokine and chemokine responses and disease severity. Samples positive for rhinovirus were used for genetic characterization, followed by profiling gene expression of pulmonary Th1 and Th2 cytokines/chemokines by RT-PCR arrays. Genetic sequencing and homology 3D modeling revealed changes at the amino terminal of the conserved viral protein 4 (VP4) epitope in the RV-A101 serotype, especially serine at several positions that are important for interactive binding with the host immune cells. We found dysregulation of pulmonary gene expression of Th1- and Th2-related cytokines and chemokines in RV-A 101 and RV-C 8 pneumonia patients. These findings might contribute to a better understanding of RV immunity and the potential mechanisms underlying the pathogenesis of severe RV infections, but further functional studies are needed to confirm the causal relationship.

- Bandar Alosaimi; Maaweya Awadalla; Wael Alturaiki, Zhao Chen; Zhaoyong Zhang; Airu Zhu; Fatimah Rebh; Abeer N Alshukairi; Jincun Zhao; **Haitham S. Alkadi**. A 10-year long-lived cellular and humoral MERS-CoV immunity cross-recognizing the Wild-type and Variants of SARS-CoV-2: a potential one-way MERS-CoV cross-protection towards a pan-coronavirus vaccine.*medical virology*. 2024.

- **Abstract**

Background: MERS is a respiratory disease caused by MERS-CoV. Multiple outbreaks have been reported, and the virus co-circulates with SARS-CoV-2. The long-term (>6 years) cellular and humoral immune responses to MERS-CoV and their potential cross-reactivity to SARS-CoV-2 and its variants are unknown. **Objectives:** We comprehensively investigated long-lasting MERS-CoV-specific cellular and humoral immunity, and its

cross-reactivity against SARS-CoV-2 and its variants, in individuals recovered from MERS-CoV infection 1-10 years prior. **Methods:** Two cohorts of MERS-CoV survivors (31 unvaccinated, 38 COVID-19 vaccinated) were assessed for MERS-CoV IgG, memory CD4+/CD8+ T cells, and neutralizing antibodies against MERS-CoV and SARS-CoV-2 variants. **Results:** MERS-CoV IgG levels and T cell responses were higher in the 1-5 vs 6-10-year post-infection groups. Vaccinated MERS-CoV survivors had significantly elevated MERS-CoV IgG and neutralization compared to unvaccinated. Both groups demonstrated cross-reactive neutralization of SARS-CoV-2 variants. MERS-CoV survivors vaccinated against SARS-CoV-2 had higher anti-MERS IgG, cellular immunity, and neutralization than unvaccinated survivors. **Conclusions:** MERS-CoV immune responses can persist for a decade. COVID-19 vaccination boosted humoral and cellular immunity in MERS-CoV survivors, suggesting the benefits of vaccination for this population. These findings have implications for pan-coronavirus vaccine development.

- Ahmed H. A. Hassanein, Raghda R.S. Hussein, Hasnaa Osama, Ahmed M. Ahmed, Razan Orfali, **Nora Albanyan** R., Mohamed Anwar Hammad. Assessment of the effectiveness of different preventive measures on prevalence of COVID-19 outbreak: a systematic review. SMJS. Volume 5 Issue 1. September 24th, 2024

Abstract

Objectives: Identify the global control measures declared by various countries against the deadly novel coronavirus (COVID-19) outbreak and their effectiveness in reducing transmission of the current outbreak of novel coronavirus COVID-19. Wuhan, China, to provide an overview of efficacy. **Methods:** Information on the effectiveness and validation of various control measures to prevent the spread of COVID-19 using an extensive review of the Centers for Disease Control and Prevention (CDC, USA) website, Google Scholar, and PubMed literature. **Results:** Adherence to social distancing, school closures, and travel restrictions were so high that some control measures had a huge impact on reducing the spread of COVID-19, while others had little or no effect on reducing infection. **Conclusions:** It concluded that awareness of the COVID-19 epidemic and adherence to control measures were crucial in eradicating such infections. Future research should explore ways to increase compliance with control measures in different countries to prevent the spread of infection. Keywords: Social isolation, school closure, COVID-19 outbreak, preventive measures, quarantine, systematic review



CLINICAL RESEARCH DEVELOPMENT AND ADVANCEMENT ADMINISTRATION EXPERTISE

Name	Position	Specialization Area Keywords			
Dr. Ali A. AlFaiz (aalfaiz@kfmc.med.sa)	Director of Clinical Research Development and Advancement Administration	Bioinformatics	Next Generation Sequencing NGS Data analysis	Omics	High-Performance Computing (HPC)
Dr. Noura AlBanyan (nalbanyan@kfmc.med.sa)	Chairperson of Clinical Research Grants Department	Parenteral nutrition	Pharmacy	Clinical pharmacy	Clinical research
Ms. Hanan Alfuraydi (halfuraydi@kfmc.med.sa)	Administrator I	Administrative support	Management	Public Health	
Mr. Majed Ali AlKahtani (malkahtani@kfmc.med.sa)	Financial Specialist I	Administrative support	Management	Accountant	
Mr. Haithm Alkadi (halkadi@kfmc.med.sa)	Chairperson of Clinical Research Technology Transfer and Advancement Department	Cancer	Hepatitis	Microarray	Sequencing
Mr. Ali Hassan AlMahraqi (aalmahraqi@kfmc.med.sa)	Administrative Specialist I	Administrative support	Management		

2024 RIYADH SECOND HEALTH CLUSTER PUBLICATIONS PER SPECIALITY

INTERNAL MEDICINE

Alshehri, Ali A., Odai M. Albahli, Abdulrahman M. Alturki, Turki A. Alwasaidi, and Nasreen F. Alfaris. "Correlation of Anemia Due to Poor Iron Status With Obesity at King Fahad Medical City, Riyadh, Saudi Arabia." *Cureus* 16, no. 1 (2024).

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Alghamdi, Abdullah S., Hamdan Alghamdi, Haleema A. Alserehi, Mohammed A. Babatin, Khalid A. Alswat, Mohammed Alghamdi, Adel AlQutub et al. "SASLT guidelines: Update in treatment of hepatitis C virus infection, 2024." *Saudi Journal of Gastroenterology* 30, no. Supp 1 (2024): S1-S42.

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Kamal, Wissam, Raed A. Azhar, Saeed Bin Hamri, Abdulaziz H. Alathal, Abdulaziz Alamri, Tarek Alzahrani, Hussain Abeery et al. "The Saudi urological association guidelines on urolithiasis." *Urology Annals* 16, no. 1 (2024): 1-27.

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Al-Hussaini, Abdulrahman, Riccardo Troncone, Suzan Alobaid, and Muhammed Salman Bashir. "Status of vitamins and minerals in children with screening-identified celiac disease: A case-control study." *Journal of Pediatric Gastroenterology and Nutrition* 78, no. 3 (2024): 677-684.

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Alammari, Yousef, Fahed A. Albednah, Khalid A. Alharbi, Abdulrahman M. Alrashoudi, Abdulaziz Y. Alsharif, Abdullah H. Alkahtani, Hasan Z. Alshehry et al. "Cardiovascular Morbidity in Systemic Lupus Erythematosus: A Single-Center Retrospective Study." *Cureus* 16, no. 4 (2024).

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