The tenth College of Pharmacy Research Day

COPRD10 | *A Decade of Achievement*

25 March 2021

10th يوم البحث العلمي بكلية الصيدلة
College of Pharmacy Research Day

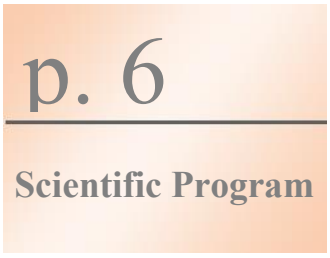
جامعة الملك سعود
King Saud University
كلية الصيدلة

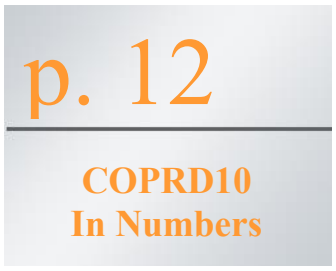
ACCREDITED
5 CME
HOURS

COPRD10 | *A Decade of Achievement*

25 March 2021

Contents





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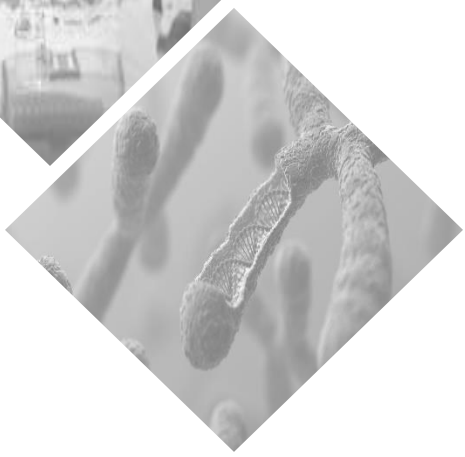
Welcoming



YEAR IN REVIEW

Welcome to COPRD 2021

10th College of Pharmacy Research Day

The College of Pharmacy Research Day is an annual forum to highlight research projects of final-year undergraduate and post graduate students.

The primary goals of the Research Day are to highlight the various types of research in the College of Pharmacy, share our mutual interests, and develop intra- and interdepartmental collaborations.

The conception of this Research Day was created in year 2007 with the aim of preparing Pharmacy students for presenting their studies at scientific conferences. Thereafter, this effort has continued in which it became mandatory for all final-year students in the College of Pharmacy to participate in this Research Day by presenting their work.

Research Day provides a great opportunity to learn about diverse research ideas being conducted within the College of Pharmacy.

Message from the Dean

To coordinate coursework with research is not an easy task. Yet, KSU Pharmacy students are dedicated to manage their time effectively and actively participate in research activities. In our BPharm and PharmD curricula, graduation research project is mandatory to final-year students. In this course, our students undergo structured and supervised training on multiple techniques relevant to their areas of interest, where they gain academic and critical skills along with lab and field experiences. Research quality is ever evolving during the years! This indicated the level of trust that our faculty members have in their trainees. Such a parameter reflects the mentorship skills of our staff as well as the professionalism level of our students. At the end of each academic year, students participate their research through poster and oral presentations in the Annual College of Pharmacy research Day, which is in its 10th versions today in 2021. And it is not uncommon to see some of the presented research accepted for presentation or winning awards at national, regional, or international conferences, or ending up published in peer-reviewed journal. The unambiguous collective and collaborative effort of students and faculties makes me thankful and proud to be part of this event!

Dr. Aws Alshamsan
Associate Professor of
Nanobiotechnology
King Saud University

Sincerely,

Aws Alshamsan, BPharm, RPh, PhD

Dean and Professor

أبنائي طلاب وطالبات بحث التخرج

طوى يومُ صحيفته وغادر...

.. وفي الساعات إيذان بآخر

بالأمس كنت أقف مبهورة بكم وأنتم تستعرضون مقترحاتكم البحثية فقد رأيت الحماس والثقة بالنفس والخطوات الأولى للبحث. واليوم وبالرغم من ظروف الجائحة التي نمر بها أكملتم مسيرتكم ونجحتم في بلوغ الهدف. وبالرغم من عدم إتاحة الفرصة لكم لعرض أبحاثكم إلا أنكم قد اكتسبتم معارف جديدة كالنقد والتحليل وجمع المعلومات وحل المشكلات وتعرفتم على أهمية البحث العلمي التي تنعكس بشكل كبير على المجتمع حيث تعمل على تحقيق التقدم والتطور.

وبعد، لا يسعني إلا أن أغتنم هذه المناسبة وأبارك لكم نجاحكم وأسأل الله التوفيق والسداد لنا ولكم جميعاً.

وكيلة كلية الصيدلة

أ.د. نورة بنت زومان الزومان

Message from the COPRD10 Chair

On behalf of the tenth College of Pharmacy Research Day (COPRD10) Executive Committee, it is my great pleasure and honor to welcome you to our 10th COPRD virtual Research Day.

COPRD10 focuses on the Pharmacy graduation research, postgraduate research and other Pharmacy-related disciplines from KSU and other institutions, as well as a broad range of issues and challenges, weaving them through our creative students, the keynote speaker, special moderators and potential judges.

This year is COPRD's tenth anniversary, which we will celebrate by delivering a very stimulating, informative and delightful program.

We received 104 submissions, 26 of which were selected for regular oral presentation, and 78 for poster presentations.

With this exciting program, COPRD10 hopes to bring together a rich diversity of research ideas spearheaded by our talented and very competent faculty members, and collaboratively sharing ideas and new perspectives with researchers from other institutions.

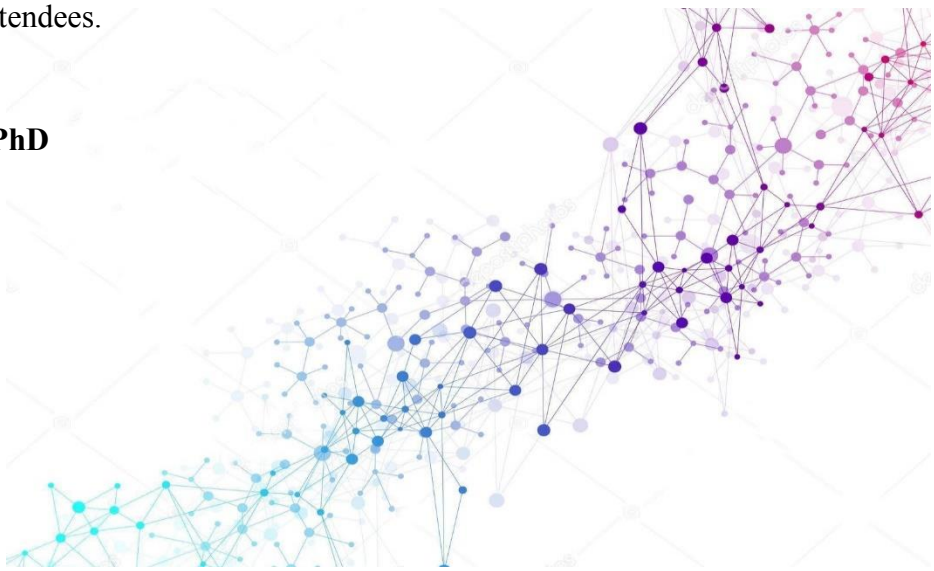
The popularity of COPRD as the premier forum for students has started to grow exponentially, where it aims to become a prominent forum where Pharmacy students, researchers and practitioners openly exchange ideas and report progress in the exciting areas of Pharmaceutical sciences.

I would like to thank all those that have dedicated their time, energy and ideas to assist in organizing this event, including all the members of the Organizing Committee, moderators, judges and our distinguished keynote speaker, Professor Manohar Garg. It is through the concerted collective efforts of these individuals that we are able to bring you a great event today.

We hope that the day's event will be stimulating, informative, enjoyable and fulfilling experience to all participants and attendees.

Maha M. AlRasheed, PhD

COPRD10 Chair



Committee

Abstract Book Editorial Board

The Abstract booklet of the 10th College of Pharmacy Research Day, published every year, has been distributed since 2011.

Editors

Maha Meshal AlRasheed, PhD
Ebtehal S. Al Abdullah, Ph.D.
Hanouf O. Aldeeb, PharmD, MSc
Mahera M. Shinwari, MSc

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Mahera M. Shinwari, MSc	**(Member & designer)**
Zakiyah M. AlKherb, PharmD	**(Member)**

Scientific Program

Event title: The 10th College of Pharmacy Research Day (COPRD10)
Date: 25th March 2021
Venue: https://coprd10.vfairs.com

Event Program:

8:00- 8:02	Quran	
8:03- 8:13	Welcome Address	**Prof. Aws Alshamsan, PhD** Dean, College of Pharmacy, KSU
8:15-8:23	Opening Remarks	**Prof. Khalid Alhomaizi** Vice Rector for Graduate Studies and Scientific Research
8:25- 8:30	COPRD Documentary	College of Pharmacy students
8:30-8:40	Honoring Sponsors	**Prof. Aws Alshamsan, PhD** Dean, College of Pharmacy, KSU

Session I
Keynote Speaker
Moderator: Dr. Raha Orfali

8:40 -9:00	Nutraceuticals: Snake oil or real medicine	**Prof. Manohar Garg** Director, Nutraceuticals Research Program University of Newcastle
9:05-9:15	**Panel discussion I**	

Session II
Live Oral Presentation
Moderators: Prof. Nourah Alzoman & Dr. Hadeel Alkofide

9:15 – 9:22	Formulation and evaluation of Dual Drug loaded PLGA nanoparticles for cancer therapy. Students: Abdulhadi M. Almoghrabi, Abdulwahab K. Alzahrani Supervisors: Abdullah Alshememry
9:25- 9:32	Comparisons of the documentation notes between pharmacists and physicians in anticoagulation Clinics Students: Nada A. Awwad, Nourah A. Alotaibi Supervisors: Mansour S Almetwazi, Abdulaziz M Alhossan , Bashayer M Alsuwayni
9:35- 9:42	Feasibility, Efficacy and Safety of Escitalopram in Functional Gastrointestinal Disorders: A Prospective Cohort Study. Students: Hala F. Almarzouqi, Gadah K. Alonazi, Amani H. Alshahrani Supervisors: Maha M. AlRasheed, Saad S. Alkhowaiter, Tariq M. Alhawassi
9:45 – 9:52	Vitamin E and Lactobacillus provide protective effects against liver injury induced by HgCl2 in rats: role of CHOP, GPR87,and mTOR proteins Students: Waad N. Alhuqbani, Shahad M. Al-Ghilani Supervisors: Ahlam M. Alhusaini

9:55 -10:02 Real-world outcomes of Rivaroxaban post authorization safety and effectiveness study in Saudi Patients
Students: Meshari A. Alqahtani, Faisal T. Alzamil
Supervisors: Saeed A. Alqahtani

10:05-10:12 The impact of lockdown and quarantine on sleep quality and psychological distress during the COVID- 19 pandemic.

Students: Afnan M. Alkadir, Khulood I. Bin Shuqiran
Supervisors: Maha M. AlRasheed, Sinaa A. Alaqeel, Haitham A. Jahrami, Ahmed S. Bahammam

10:15-10:22 Al Razi, we are here to test " your magic mix" A Study for Testing the Antibacterial Efficacy of an Ancient Remedy for Dermatological Infection
Students: Roozan A. Alsahli, Shaden O. Alaqeel
Supervisors: Dr. Raha orfali , Dr.Razan orifali

10:25 – 10:55 Panel discussion II

Session III
Live Oral Presentation
Moderators: Dr. Aliyah Almomen & Dr. Ahmed Aldemerdash

11:00-11:07 Measuring Quality of Life among patients with the most common types of cancer in a University Hospital in Saudi Arabia
Students: Abdulaziz S. Alsuhaibani, Basil J. Alotaibi
Supervisors: Mohammad Aljawadi, Nora Alkhudair

11:10-11:17 Cardiovascular outcomes associated with coronavirus disease 2019 (COVID-19): a systematic review and meta-analysis.
Students: Rahaf S. Almesned + Lujain K. Alnoghaimshi
Supervisors: Hadeel A. Alkofide

11:20-11:27 Synthesis and Antibacterial activity of 3-chloro- monocyclic b-lactams derived from Schiff's bases
Students: Norah S.alharbi and Muneera K.alkanaan
Supervisors: Dr. Fatmah al-Omar

11:30 -11:37 Contraception Protocol in Saudi Arabia- A Needs Assessment
Students: Rahaf H. Alasmari, Shaden A. Almuneef
Supervisors: Noha A. Al Aloola

11:40- 11:47 Development of inhalable dry powder dosage form containing luteolin NPs for lung cancer therapy.
Students: Dana M.Alnader, Reem I.Alfowzan
Supervisors: Dr. Alanood Almurshedi, Dr. Basmah Aldossary

11:50-11:57 Assessing the roles and responsibilities of informal caregivers for adult patients in Saudi Arabia.
Students: Nouf F. Alqahtani
Supervisors: Saja Almazrou

12:00-12:20 Break
12:30-13:30 Parallel Poster viewing and evaluation at the virtual poster hall

Session III- Continued
Live Oral Presentation
Moderators: Dr. Aliyah Almomen & Dr. Ahmed Aldemerdash

12:20 -12:27	Evaluation of Antipyretics use and heat sensitivity in patients with MS and it is impact on QOL Students: Noura F. Alaifan , Badria T. Althwaini Supervisors: Abdulaziz M. Alhossan
12:30- 12:37	Lyophilized solid dispersions for enhancement of the aqueous solubility and dissolution of a poorly soluble drug. Students: Thikra M. Aljamal Supervisors: Dr. Basmah Aldosari
12:40-12:47	The Use of Anticoagulants in COVID-19 Patients: A Follow Up Study Students: Waleed M. Almutairi , Raed N. Qahtani Supervisors: Saeed Alqahtan

12:50 – 13:20 Panel discussion III

Session IV
Live Oral Presentation
Moderators: Dr. Omar Almohammad & Dr. Awatef Albaker

13:20- 13:27	Formulation and physicochemical assessment of luteolin loaded nano lipid vesicular formulations. Students: Khalid H. Alyahya Supervisors: Sultan Alshehri
13:30-13:37	A systematic review of Quality of Life instruments in Dialysis patients Students: Almothanna S. Alghamdi, Asim A. Babaeer Supervisors: Mohammad Aljawadi
13:40- 13:47	Luteolin loaded vesicular nanocarrier to control breast cancer: In-vitro and ex-vivo evaluations Students: Mohammad AlRajhi Supervisors: Mohammad AlTamimi
13:50-13:57	Cross Sectional study to evaluate burnout among hospital and community pharmacists in Saudi Arabia during COVID-19 pandemic Students: Munerah Alshabanah Supervisors: Lobna A. Aljaffali, Haya Almalaq
14:00- 14:07	Estimation of Metformin Medication Adherence using Dried Blood Spot Analysis Students: Nour M. Almubyedh, Adeem S. Almalike Supervisors: Nouf Aloudah, Bushra Alqadib
14:10- 14:17	Pharmacists initiated interventions in monitoring and management of Bevacizumab adverse events in cancer patients: a prospective cohort study Students: Abdulaziz A. Alshaibany, Saleh A. alzurier Supervisors: Abdulrahman M. Alwhaibi , Nora A. Alkhudair
14:20-14:27	Aerosolized plus intravenous polymyxin versus intravenous polymyxin alone for the treatment of nosocomial pneumonia: A retrospective cohort study Students: Aljwhara K. Alrasheed, Rehab M. Almutairi Supervisors: Thamer Almangour

14:30- 14:37 Factors associated with hospital visits for acute pharyngitis: national estimation in the KSA
Students: Abdulrhman E. AlQuifly, Saleh M. AlSaqoub
Supervisors: Abdullah H. Alzeer, Abdullah Althemery

14:40- 14:47 Novel Gold-Containing Anticancer AD152 Induces Cytotoxicity via Oxidative Stress-Mediated Intrinsic Apoptotic Pathway in Triple-Negative Breast Cancer
Students: Ahmed K. Abogosh, Meshal K. Al-Ghanem
Supervisors: Ali R. Alhoshani

14:50- 14:57 Inflammation and Treatment-Resistant Depression from Clinical to Animal Study: A possible link?
Students: Lara F. Almutabagani, Raghad A. Almanqour
Supervisors: Nouf M. Alrasheed, Jawza F. Alsabhan

15:00-15:25 Panel discussion IV

15:30-16:30 Awards and Closing Remarks

Prof. Aws Alshamsan
Dean, College of Pharmacy
Dr. Maha M. AlRasheed
COPRD10, Chair

COPRD10 Awards

The college of pharmacy is pleased to announce the 10th College of Pharmacy Research Day Competition. The competition is open to all COPRD presenters.

Best professional abstract poster presentation award

KSU pharmacy post graduate students one best professional abstract poster presentation award will be given to the best selected professional abstract

Best Poster Presentation Award

KSU pharmacy graduation research (PHCL 490 &PHTR495) students. The top twenty scoring poster abstracts will be selected as winners and fifteen awards will be given

Best Oral Presentation Award

KSU pharmacy graduation research (PHCL 490 &PHTR495) students. The top ten scoring oral abstracts will be selected as winners and five awards will be given.

Young Pharmacist Research Award (YPHRA)

KSU pharmacy undergraduates (not a graduation research) and non KSU pharmacy students. The top three scoring abstract poster presentation will be awarded the Young Pharmacist Research Award (YPHRA).

Professor

Manohar Garg

Keynote Speaker

Professor Manohar Garg occupies a Personal Chair in Nutritional Biochemistry and is the Director of the Nutraceuticals Research Unit at the University of Newcastle. He has also been appointed as an Honorary Professor of the Riddet Institute (National Centre of Research Excellence) at the Massey University in New Zealand. A recognized world authority on fatty acid nutrition; anti-inflammatory, anti-aggregatory and anti-oxidant benefits of bioactive nutrients, he has fostered strategic alliances with the food and dietary supplement industries to develop functional foods. He has published over 250 publications in high impact international journals and his current H-index is 45 (Scopus) and 42 (Web of Science). He served as the Immediate past President (20011-2013); as President (2009-2011) and President Elect of NSA between 2007-2009 of the Nutrition Society of Australia. He is the current Editor-in-Chief for the *Journal of Nutrition & Intermediary Metabolism* and Associate Editor for the international journals: *Progress in Lipid Research* AND *Journal of the Science of Food & Agriculture*.

Professor Garg was recognized as a Fellow of the Nutrition Society of Australia, a rare and the highest award of the Nutrition Society of Australia in 2013. Professor Garg has been awarded the 2012 Professor Austin Doyle Medal in recognition of his outstanding contributions in cardiovascular sciences especially role of nutrition, in particular prevention of complications of cardiovascular disease by the Indian Society of Hypertension. He has also been awarded the 2012 Nutrition Society of Australia Medal, which is awarded to Australian nutrition scientists with an outstanding record in the field of animal or human nutrition with the work carried out predominantly in Australia. More recently he has been awarded the Excellence in Research Innovation Award in recognition his research on nutraceuticals.

Professor Manohar Garg
Director, Nutraceuticals Research Program
University of Newcastle

COPRD10

in Numbers

86

Graduation Research Projects

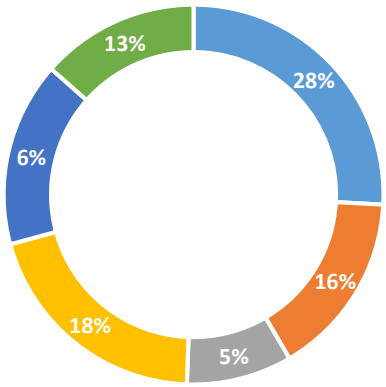
Graduation research projects were completed under six different research themes.

62 Boys

83 Girls

145 students

Graduation Projects per Research Theme



- Pharmacy Practice and Pharmacotherapy
- Social Pharmacy and Pharmaceutical outcomes
- Medicinal Chemistry and Natural Products
- Experimental Therapeutics and Toxicology
- Pharmaceutical Engineering and Drug Regulation
- Others

6 Sites

Project's KSU supervisors extended their capabilities through collaborative project work with faculty and scholars to better contribute to scientific outcome. They successfully partnered with leading academic and research institutions such as the Ministry of health, King Saud University Medical City, King Abdul-Aziz University Hospital, King Abdullah research center, King Fahad Medical City, and Lean business service company

17

Non-KSU Supervisors

17 supervisors were involved in the graduation research 2020-2021 from different institutions

93

KSU Supervisors

Each research student had the opportunity to select his/her supervisor. Students receive advice and guidance from their supervisors throughout their research period. The graduation research committee ensures that research students receive sufficient support and guidance to facilitate their success.

8

Postgraduate Students

8 Postgraduate students participated in COPD10

11

YPHRA Awards

10 projects were included for the young pharmacist research award (YPHRA)

Oral Presentations Abstracts

Pharmacy Practice and Pharmacotherapy

Abstract Code: 001

Contraception Protocol in Saudi Arabia- A Needs Assessment

Student(s) Name: *Rahaf H. Alasmari, Shaden A. Almuneef*
Supervisor(s) Name: *Noha A. Al Aloola*

Abstract:
Background Studies done on Saudi community indicated a need for improving community knowledge about contraception, implementing some guidelines and restricting contraception dispensing. However, there is a lack of studies assessing the need for contraception protocol from physicians' perspectives. This study aimed to assess the need of contraception protocol from perspectives of Ob/Gyn physicians.
Methods Qualitative in-depth, semi-structured interviews were conducted in the period between October 2020 to January 2021, with a convenience sample that comprised physicians from Department of Obstetrics and Gynecology in KKUH. Interviews were audio-recorded, transcribed verbatim, then analyzed using NVivo (QSR International) Software.
Results A total of 12 interviews were conducted and analyzed. Thirteen themes pertaining to the contraception practice in KSA from Ob/Gyn specialist's perspectives were identified and grouped into three major categories: (1) Current contraception prescribing practice, (2) The need for contraception protocol; and (3) Difficulties hinder the development and implementation of contraception protocol. The participants indicated a lack of prescribing restriction, highlighted issues of low contraception literacy community have, self-prescribing, health system organization, and physician's knowledge. Participants perceived the need for contraception protocol which guiding the prescribing process and patient counseling without restricting the prescribing. They highlighted a number of factors affecting development and implementation of such protocol includes; availability of contraception, need for research and physician's education, some patients factors and the load increased on the hospital.
Conclusions This research describes the current practice, shows the need for contraception protocol, and highlight the factors affecting the development and implementation of such protocol.

Abstract Code: 002

Real-world outcomes of Rivaroxaban Post authorization safety and effectiveness study in Saudi Patients

Student(s) Name: *Faisal T. Alzamil & Meshari A. Alqahtani*
Supervisor(s) Name: *Saeed A. Alqahtani*

Abstract:
Background: Non-ventricular atrial fibrillation (NVAF)/venous thromboembolism, arterial thrombosis and stroke are life-threatening diseases. Rivaroxaban is a Factor Xa inhibitor, which is recently used in treating such diseases.
Objective: To investigate the safety and effectiveness of rivaroxaban in real-world clinical practice in Saudi Arabia.
Method: This was a retrospective cohort, post-marketing surveillance study. Patients with NVAF/venous thrombosis, arterial thrombosis, and stroke who began treatment with rivaroxaban enrolled in the study. Data collected from January 2015 to December 2019 patients' to examine the outcomes.
Results: A total of 2316 patients from king Khalid University Hospital taking rivaroxaban. The incidence rates of recurrent thrombosis and recurrent stroke were 0.2%. Whereas, the incidence rate was 0.04% for MI. 50% of these patients were using 15 mg/day and the other 50% using 20 mg/day of rivaroxaban. The incidence rate of major bleeding was 1.1%. More than 50% of the patients who had major bleeding were on 20 mg daily dose of rivaroxaban. 48% of these patients has a high risk for bleeding according to HAS-BLED Score(>2 score). The incidence rate of non-major bleeding was 0.6%. Likewise, 40% of these patients were on 20 mg daily dose of rivaroxaban. Only 6.6% of these patients had a high risk for bleeding according to HAS-BLED Score. Whereas, 93.4% of the patients had moderate risk.
Conclusion: In this real-world cohort study, rivaroxaban appears to be more effective with a dose of 20 mg for patients with VTE and NVAF. Rivaroxaban was also associated with a lower risk of safety events.

Abstract Code: 003

Cardiovascular Outcomes Associated with Coronavirus Disease 2019 (COVID-19): A Systematic Review and Meta-Analysis

Student(s) Name: *Rahaf Almesned, Lujain Alnoghaimshi*
Supervisor(s) Name: *Hadeel Alkofide MSc, PhD*

Abstract:
Background A higher incidence of cardiac complications has been observed in patients with

coronavirus disease 2019 (COVID-19). However, it remains unclear if there is a strong association with disease severity. Our aim was to identify the cardiovascular complications associated with COVID-19**.**

Methods We have systematically searched databases, including Medline, Google scholar, and MedRxiv. The screening was carried out by two investigators independently. Observational studies reporting the outcome of myocardial injury or heart failure, comparing between severe and non-severe COVID-19 patients, were considered eligible. Demographic information, comorbidities, and cardiac outcomes were extracted from eligible studies. Quality assessment was performed using the Newcastle–Ottawa quality assessment scale for cohort and case-control studies and AXIS tool for cross-sectional studies. Random effect models were used when pooling crude numbers of study outcomes. Statistical heterogeneity was measured using the I^2 statistic.

Results A total of 3,381 potentially eligible studies were identified. Of these, thirty-two studies with a total of 6,315 patients were included in this meta-analysis. The overall incidence of acute myocardial injury was 932 (16%) in hospitalized COVID-19 patients. The included studies were mostly of moderate quality. Acute myocardial injury was significantly higher among patients with severe COVID-19 compared to non-severe (RR 6.83, 95% CI 4.25-10.97, I^2=82%). Heart failure was higher in severe cases compared to non-severe (RR 5.05, 95% CI 2.20-11.59, I^2=40%)

Conclusions Severity of COVID-19 can significantly impact the development of cardiac complications, this highlights the importance of early identification and management of cardiac abnormalities, to improve health outcomes of COVID-19 patients.

Abstract Code: 004

Feasibility, Efficacy and Safety of Escitalopram in Functional Gastrointestinal Disorders: A Prospective Cohort Study

Student(s) Name: *Amani H. Alshahrani, Hala F. Almarzouqi, Gadah K. Alonazi.*
Supervisor(s) Name: *Maha M. AlRasheed, Saad S. Alkhowaiter, Tariq M. Alhawassi*

Abstract:

ABSTRACT:

Background :The safety and efficacy of Escitalopram in patients with functional gastrointestinal disorders (FGIDs) are still debatable. The study objective was to evaluate the safety and efficacy in the management of FGIDs in the Saudi population.

Methods: We included 51 patients who received Escitalopram for irritable bowel syndrome (n=26), functional heartburn (n=10), globus sensation (n=10) or combined disorders (n=5). We used an IBS-sss, GerdQ questionnaire and GETS to assess disease severity change before and after treatment.

Results: The median age of the patients was 33 years (25^{th} – 75^{th} percentiles: 29-47) and 26(50.98%) were male. Forty-one patients (80.39%) experienced mostly mild side-effects after taking Escitalopram. The most common side-effects included drowsiness/fatigue/dizziness (54.9%), xerostomia (23.53%), nausea/vomiting (21.57%) and weight gain (17.65%). Pre-treatment IBS score was 375 (25^{th} - 75^{th} percentiles: 255- 430) versus post-treatment score of 90(58- 205) (P < 0.001). Pre-treatment GERD score was 12(10-13) versus 7(6-10) following treatment (P=0.001). Pre-treatment Globus score was 32.5(21-46) versus 22(13- 31) (P= 0.002) after treatment. Thirty-five patients refused to take the medication, while seven discontinued it after few days. Possible causes for poor compliance included fear of the medication, lack of conviction towards taking psychiatric medications for FGID, side-effects, improvement with other medications or lifestyle change, medication unavailability, drug-drug interactions and family disapproval.

Conclusion: Escitalopram could be a safe and effective treatment for FGIDs. Targeting and managing factors leading
to poor compliance could improve the outcome. The confirmation of the study findings in a larger randomized trial is recommended.

Abstract Code: 005

Aerosolized plus intravenous colistin versus intravenous colistin alone for the treatment of nosocomial pneumonia due to multidrug-resistant Gram-negative bacteria: A retrospective cohort study

Student(s) Name: *Rehab M. Almutairi; Aljwhara K. Alrasheed*
Supervisor(s) Name: *Thamer A. Almangour*

Abstract:

Background The use of aerosolized (AER) colistin for the treatment of pneumonia is controversial. The purpose of this study was to compare the effectiveness and safety of AER plus intravenous (IV) colistin to IV colistin alone in patients with nosocomial pneumonia (NP) due to multidrug-resistant (MDR) Gram-negative bacteria.

Methods This was a retrospective cohort study of adults with NP who received IV colistin alone or in

combination with AER colistin. The primary endpoint was clinical cure at end of therapy. Secondary endpoints included microbiologic eradication, in-hospital mortality, and nephrotoxicity. The study was approved by the institutional review board.

Results 135 patients were included: 65 patients received AER plus IV colistin and 70 patients received IV colistin alone. Clinical cure was achieved in 42 (65%) patients who received AER plus IV colistin and 26 (37%) patients who received IV colistin alone (P = 0.01). Among a total of 88 patients who were microbiologically evaluable, 27 (42%) patients in AER plus IV group and 12 (17%) patients in IV alone group attained favorable microbiologic outcome (P = 0.022). In-hospital mortality (43% vs. 59%, P = 0.072) was higher in the IV alone group, but the difference was not statistically significant. Renal injury occurred in 31% of patients in AER plus IV colistin group and in 41% of patients in the IV alone group (P = 0.198).

Conclusions AER colistin can be considered as salvage therapy as an adjunct to IV administration for the treatment of patients with NP due to MDR Gram-negative pathogens.

Abstract Code: 006

Evaluation of Antipyretics use and heat sensitivity in patients with MS and it is impact on QOL

Student(s) Name: *Noura F.Alaifan Badria T. Althwaini*
Supervisor(s) Name: *Abdulaziz M. Alhossan*

Abstract:

Background Multiple sclerosis (MS) is a progressive neurological disorder leading to disrupt autonomic functions. The specific mechanism of temperature-dependent in MS remains unclear. Between 60% and 80% of MS patients find that heat can worsen their symptoms and cause relapses. This happens generally by exposure to warm environment, exercise, or hot baths. Antipyretic use was shown to reduce the heat sensitivity and risk of relapse in MS patients.

Methods A cross sectional retrospective chart review study for all MS patients seen at King Khalid University Hospital between June 2015 to Dec 2018. Demographics and MS treatment regimens data were collected. A phone-based interviews were conducted to collect data regarding heat sensitivity, prophylaxis techniques, and number of relapses. IRB Approval was obtained prior starting the study.

Results 117 patients were included in this study, in which 67% of them are females and the average age was 39.5 years. Almost half of the sample reported heat sensitivity (44%) and only 24% follow cooling techniques. The most used antipyretic was paracetamol (46%) followed by NSAIDs (5%). More than 10% of the sample reported having at least 1 MS relapse per year, and 48% have known relapses triggers. Using of interferon was associated with higher risk of temperature elevation and antipyretics use (p-value 0.034).

Conclusions The study found that heat sensitivity is common among MS patients and increases risk of relapse. However, only small number of patients use antipyretics as prophylaxis. MS relapses can be prevented or reduced by avoiding triggers and using prophylactic antipyretics.

Abstract Code: 007

The Use of Anticoagulants in COVID-19 Patients: A Follow Up Study

Student(s) Name: *Raed N. Qahtani, Waleed M. AlMutairi*
Supervisor(s) Name: *Saeed A. Alqahtani*

Abstract:

Background: Mortality in COVID-19 patients has been associated with hyper-coagulopathy with the incidence of thrombotic disease being as high as 31% with a significant mortality benefit being observed with the use of therapeutic anticoagulation in high-risk individuals. This study aims to assess the behavior of COVID-19 disease regarding occurrence of thrombosis after discharge.

Design:A retrospective cohort where data from an electronic medical system of a tertiary teaching hospital in Riyadh, were collected from May 2020 to March 2021, all data were entered in a purposefully designed Excel sheet, Data was analyzed using SPSS v22 where categorical data was presented in frequency and percentages whereas numerical data was evaluated as mean standard deviation.

Results: A total of 486 COVID-19 patients taking anticoagulation prophylaxis in King Saud University Medical City (KSUMC) with a mean age of 40 years (±17) were enrolled in this study, Enoxaparin was the most common anticoagulant used in those patients (12%) While, heparin was second with 4%, the rest were Rivaroxaban (1%) and Warfarin (0.2%), 82% of the patient did not get any kind of prophylaxis during the course of the disease. The incidence rates of thrombosis and stroke were 0.82 and 1.2 respectively. The incidence rate of non-major bleeding was 1.02% and none of the patients had major bleeding.

Conclusion: In this cohort study, enoxaparin was the most common anticoagulant used, with the rate of thrombosis and stroke being low in this study we believe more studies are required to better understand the behavior of the disease regarding coagulation.

Abstract Code: 008

Pharmacists initiated interventions in monitoring and management of bevacizumab adverse events in cancer patients: a prospective cohort study

Student(s) Name: *Abdulaziz Abdulrahman alshaibany, Saleh Ali alzurier*
Supervisor(s) Name: *Dr. Abdulrahman alwahibi*

Abstract:
Background: Despite the acceptable risk/benefit profile of bevacizumab, it was shown to associate with severe adverse events (AEs) highlighting the potential role of clinical oncology pharmacist to avoid such incidences.
Methods: This was a 3-month prospective study conducted at KKUH on adult oncology patients administered ≥ 1 dose of bevacizumab. Blood pressure, renal function, surgical history, risk of bleeding or thrombosis were checked before bevacizumab administration and pharmacist interventions were documented. Clinical significance of interventions was evaluated using the Hatoum criteria. Any adverse event noted in patients' profiles at inclusion or reported during the study period was documented as well.
Results: During the study period, 33 patients were recruited with mean age of 53.7 years (± 8.25 SD), and 42 % were diagnosed with colon cancer as a primary cancer. A total of 41 interventions have been documented in our patients, whom ≥ 9.1 % had 2 types of intervention. Of the interventions, 53.7 % were due to incomplete/old renal function tests; Whereas 29 % were to hold bevacizumab in 9 patients. According to the Hatoum criteria, 36.6 % were very significant and necessary to prevent/ameliorate organ damage while 63.4% brought more acceptable level of health care. Hypertension (9 cases) followed by proteinuria (7 cases), were the most common AEs, as they occurred in 5 and 6 patients, respectively. VTE was documented in 2 patients.
Conclusions: Active participation of oncology pharmacists in monitoring cancer patients treated with bevacizumab is very crucial demonstrated by the significance of their clinical interventions.

Social Pharmacy and Pharmaceutical Outcomes

Abstract Code: 009

Comparisons of the documentation notes between pharmacists and physicians in anticoagulation clinics

Student(s) Name: *Norah Abdullah Alotaibi , Nada Ahmad Awwad*
Supervisor(s) Name: *Mansour S Almetwazi.*

Abstract:
Background: Documentation is essential in any clinical sitting. Physician and pharmacists led anticoagulation clinics in many sittings. The objective of this study was to compare documentation difference between pharmacist and physician in anticoagulation clinics.
Methods: Patients who scheduled for anticoagulation clinics from October to December, 2020 in King Khalid University Hospital, Riyadh, Saudi Arabia were included. After reviewing 469 patients, a total of 331 patients were included. The remaining were excluded either due to no note was writing or the patients did not show up. The comparison between documentation notes were based on writing the diagnosis, medication name, plan, lab, follow up, timing of follow up, interactions, and assessing the adverse effects. Notes were divided based on score from 0 to 10 (very good, good, average, bad, very bad). T-test, chi-square, and fisher's exact were used as appropriate using Stata program.
Results: Results showed that 51% of patients seen by pharmacist. The mean age was 53.8 years, most of them were Saudi (90%) and 61% of patients were female. The result revealed a significant difference regarding documentation between pharmacists and physician ($p<0.0001$). A total of 28% of very good documentation was done by pharmacist compared to 8.45% done by physician. Only 3 documentations were very poor in pharmacist led clinic compared to 13 documentations in physician led clinics. Sub-analysis of all variables showed that significant favor toward pharmacists except in plan where it shows no significant.
Conclusion: Pharmacists documentations are better than physicians. Developing a unified documentation form is essential.

Abstract Code: 010

Cross Sectional study to evaluate burnout among hospital and community pharmacists in Saudi Arabia during COVID-19 pandemic

Student(s) Name: *Munerah O. Alshabanah*
Supervisor(s) Name: *Lobna A. Aljaffali , Haya M. Almalaq*

Abstract

Background: Coronavirus disease (COVID-19) places healthcare workers including pharmacists at an elevated risk of infection and increase their workload which could lead to burnout. Therefore, this study aims to measure burnout among hospital and community pharmacists population in Saudi Arabia during COVID-19 pandemic and to identify the risk factors associated with burnout.

Methods : This study is a cross-sectional online survey distributed in Saudi Arabia among community and hospital (inpatient, outpatient, clinical & administration) pharmacists. Copenhagen Burnout Inventory (CBI) survey was used. A 19-items survey that covers three areas: personal, work, and patient-related burnout. The survey also included questions about socio-demographic factors and the major causes of psychological distress among pharmacists during COVID-19 pandemic.

Results: A total of 502 pharmacists were included, (59.1%) of them categorised as having clinically relevant burnout levels (≥50). On univariate analysis Burnout level was statistically significant($p<0.05$) higher with younger age, gender(female), less years of experience and working in the community pharmacy. The main characteristics associated with high burnout in community pharmacists were: younger age with less years of experience, gender(male), non-Saudi nationality and greater customers number. In COVID-19 part of the survey, burnout was strongly related to COVID-19 pandemic.

Conclusions: More than half of hospital and community pharmacists in Saudi Arabia have burnout. Major risk factors causing burnout included Age, female gender, years of experience, lack of supportive culture, sleep disturbances and worriers with job load related to the pandemic like fears to be infected and increase working hours.

Abstract Code: 011

The impact of lockdown and quarantine on sleep quality and psychological distress during the COVID-19 pandemic

Student(s) Name: *Afnan M. Alkadir, Khloud E. Alshoqiran*

Supervisor(s) Name: *Maha M. AlRasheed, Sinaa A. Alaqeel, Haitham Jahrami, Ahmed S. Bahammam*

Abstract:

Background: The spread of COVID-19 and the governmental measures could affect sleep and mental health. We investigated the effect of quarantine on sleep quality and psychological distress; additionally, we assessed factors predicting them.

Methods: We conducted a survey on 836 individuals from May to June 2020. Sleep quality was assessed with PSQI and psychological distress with K10 scores. PSQI score ≥ 5 indicated poor sleep. K-10 scores ≥ 20 indicated significant distress.

Results: 733 participants had a poor sleep. Predictors of poor sleep were changes in sleep habits (OR: 2.49, P=0.004), coronavirus news on social media (OR: 2.13, P=0.02), fear towards lack of COVID-19 drug (OR: 1.72, P=0.03), and disease unawareness (OR: 9.15, P=0.03). 568 participants had distress. Younger age (OR: 0.98, P=0.01), males (OR: 0.69, P=0.049), living in Riyadh (OR: 0.58, P=0.002), and loving and waiting for social events (OR: 0.68, P=0.02) were associated with no distress, while coronavirus news on social media (OR: 1.42, P<0.001), change in sleep habits (OR: 1.79, P=0.04), fear of no COVID-19 drug (OR: 2.08, P=0.004), income <SR1000 (OR: 2.02, P=0.01), isolation (OR: 1.96, P=0.03) and no disease awareness(OR: 2.26, P=0.04) were associated with distress. PSQI and K-10 scores correlated positively (rho=0.41, P<0.001).

Conclusions: Poor sleep and psychological distress symptoms were highly prevalent in our population. Quarantine may impact psychological health. Future preventive measures should target predictors of poor sleep or distress.

Abstract Code: 012

Measuring Quality of Life among patients with the most common types of cancer in a University Hospital in Saudi Arabia

Student(s) Name: *Abdulaziz S. Alsuhaibani, Basil J. Alotaibi*

Supervisor(s) Name: *Nora A. Alkhudair, Mohammad H. Aljawadi*

Abstract:

Background: The Health-Related Quality of life (HRQOL) represents a crucial clinical outcome among cancer patients. The most common types of malignancies in Saudi Arabia among both genders are breast, colon, thyroid, and non-Hodgkin lymphoma. We aim to assess the HRQOL score for patients with the most prevalent cancer types in a university hospital.

Methods : This is a cross-sectional study, included adult patients (≥18 years old) who are actively receiving chemotherapy in the medical oncology day care clinic. The participants were interviewed by using the EORTC QLQ-C30 questionnaire, which covers three main domains: physical, psychological, and social function. Further information was collected to detect the factors that influence the quality scores. The

statistical analyses were processed by using STATA according to the EORTC QLQ-C30 guideline.
Results: Out of 90 participants, ~76 % were females and the mean age was 53.3 ± 12.5 years. The mean global health status score was 72.3 ± 20.7. In the functional domain, the highest reading was cognitive score 87.9 ± 18.7 contrary to the lowest readings which were, physical and social 70.1 ± 23.6, 70.1 ± 30.1 respectively. In the symptom domain, the most observed symptoms were fatigue (37 ± 22.7), insomnia (35 ± 38.1), and pain (29 ± 26.6).
Conclusions: Most of the patients demonstrated high-quality scores. These results substantiate the previous literature findings. Future, studies should focus on factors associated with higher quality of life score

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Abstract Code: 013

Factors associated with hospital visits for acute pharyngitis: national estimation in the KSA

Student(s) Name: *Abdulrhman Emad AlQuifly, Saleh Mohammed AlSaqoub*
Supervisor(s) Name: *Abdullah Hamad Alzeer, Dr. Abdullah Uthman Althemery*

Abstract:
Background: Infectious diseases are caused by bacteria, viruses, fungi, or parasites. They are generally harmless. Nevertheless, some species can cause harm. The burden of outpatient visits is crucial, comprising a large part of the economic healthcare burden caused by potentially preventable diseases. The main objective of this study is to explore electronic prescriptions for acute pharyngitis.
Methods: This cross-sectional investigation explores data retrieved from an electronic prescription database from January 2019 until December 2019. The data feeds into Electronic Prescription (ERx) from two main sources (the Ministry of Health's 937 operation call center and the Anat platform). A descriptive analysis was conducted to list each medical condition and its associated prescription. An in-depth analysis for acute pharyngitis was performed by looking at the different associated outcomes. SAS and Power BI were employed for data analysis and data visualization.
Results: Over 261,970 events with complete data information were available. Acute pharyngitis accounted for 8,336 events. A gender comparison for patients with acute pharyngitis demonstrated a significant difference. The average age for females (M=22.90 [SD=16.93]) was significantly higher than for males (M= 20.9724 SD=[16.9299]) p <.0001, t value=5.19 DF=8297.
Conclusion: Our findings show that acute pharyngitis was one of the most common events requiring a prescription. The Electronic Prescription database provided by the Ministry of Health has shown its significant value by eliminating unnecessary yet frequent visits to outpatients' clinics while maintaining patients' overall healthcare quality.

Abstract Code: 014

A systematic review of Quality of Life instruments in dialysis patients

Student(s) Name: *Asim A. Babaeer, Almothanna S. Alghamdi*
Supervisor(s) Name: *Mohamad H. Aljawadi*

Abstract:
Background: Patients undergoing hemodialysis treatment endure considerable physical, psychosocial and financial difficulties that negatively impact their Health-Related Quality of Life (HRQoL). Many patients experience dialysis as a heavy burden, they even have poorer HRQoL than patients with diabetes or malignancies.
Method: We conducted a systematic search From February 2000 to September 2019 with words such as Quality of life, Instruments, Hemodialysis, Adults. All were conducted using the following database: Cinahl, Pubmed and Embase. The resulting Articles were 884 after removing 241 duplicated articles. Articles were included if they were used in at least one instruments that measuring one or more aspects of QoL (physical, psychological, social, Environmental and spiritual), resulting with 340 articles included. 248 articles were using duplicated or old version of instruments, 30 were invalid, 46 valid in general population and 7 valid in other condition other than hemodialysis, which were all excluded.
Results: This review identified a total of 36 studies with 43 final instruments, which those instruments were divided according to their relationship with the state of dialysis, 21 Disease-related such as Thirst, Itchiness, Restless leg syndrome, Sexual dysfunction. 11 Condition-related such as Fatigue, Ability to perform activities, Work and social implications, and 11 Mental state related such as depression and anxiety.
Conclusion: CKD patients undergoing dialysis go through a lot of lifestyle modification alongside the major discomfort and inconvenience the disease has, we believe that this review will help guide researchers and clinicians towards the most appropriate tools to use in assessing QoL of adult CKD patients undergoing dialysis.

Medicinal Chemistry and Natural product

Abstract Code: 015

Synthesis and antibacterial activity of 3-chloro-monocyclic -lactams derived from Schiff's bases

Student(s) Name: *Norah S.Alharbi , Muneera K.Alkanaan*
Supervisor(s) Name: *Fatmah A.AlOmary*

Abstract:
Background: In the recent years, several natural monocyclic β-lactams were shown to exhibit high activity against Gram-positive and Gram-negative bacteria. In view of high activity of monocyclic derivatives, synthesis of suitably substituted β-lactam is an importance and structural diversity of biologically active β-lactams led to the development of many synthetic methods for the construction of the appropriately substituted 2-azetidinones.
Methods: Well-documented methods for synthesis of monocyclic β-lactams antibiotics such as ketene-imine cycloaddition and acid chloride were adopted. 3-chloro-monocyclic β-lactam compounds have been synthesized along with reported compounds for the purpose of comparison of antimicrobial activity. Structure elucidation of the newly synthesized eleven compounds was achieved by elemental analysis, IR, Mass Spectroscopy and Thin layer chromatography. antimicrobial screening was carried out using the agar-well diffusion assay performed against Staphylococcus aureus ATCC 29213, Escherichia coli ATCC 25922 and Candida albicans ATCC 10231, using benzylpenicillin as a standard reference β-lactam.
Results: Compound 4-chlorobenzylidine-2-amino-1,3-thiazole (**I_{10}**) is the only active Schiff's bases prepared in this study. Compounds1-(4-bromophenyl)-3-chloro-4-(3,4-dimethoxyphenyl)-2-azetidinone (**III_1**), 1-(1,3-thiazol-2-yl)-3-chloro-4-(4-chlorophenyl)-2-azetidinone (**III_7**), 1-(4-chlorophenyl)-3-chloro-4-(3-methoxy-4-hydroxyphenyl)-2-azetidinone (**III_8**) and 1-(3-bromophenyl)-3-chloro-4-(4-methoxyphenyl)-2-azetidinone (**III_9**) are the most active 3-chloro-monocyclic β-lactams in this study.
Conclusions: Compound (**I_{10}**) was found to be active against Staphylococcus aureus. Compounds (**III_1**) , (**III_8**) and (**III_9**) showed activity against Staphylococcus aureus, Candida albicans with no activity against Escherichia coli, compound (**III_7**) proved to be the most active one of the four compounds. It has an activity against the three test organisms.

Abstract Code: 016

"Al Razi, we are here to test your magical mix" A study for testing the antibacterial efficacy of an ancient remedy for dermatological infection.

Student(s) Name: *Ruzan A. AlSahli, Shaden O. AlAqeel.*
Supervisor(s) Name: *Raha S. Orfali, Razan S. Orfali*

Abstract:
Background: Antimicrobials have been in use for many thousand years. Although modern medicine has made great progress over the past decades, there is still a struggle in the fight against dermatological microbial infections. Islamic medical texts were considered a rich source of natural antimicrobial. A remedy for impetigo was found in (Al-Hawi book) for Al Razi. It instructs the reader to crush and mix boswellia, sulfur, aloe, vitriol and gum Arabic, then add vinegar.
Methods: Bacteria causing impetigo strains were used. Al Razi Mix (RM) was prepared as mentioned in the book and the antimicrobial activity of the remedy was evaluated by disk diffusion method. Each individual ingredient was prepared, and a similar process is followed for "dropout patches" where one ingredient at a time is excluded from the remedy and replaced with an equal amount of water. Standard antibiotic (vancomycin) served as positive control (PC). The results obtained were satisfactory compared to the positive control. ANOVAs were used to analyze each data set.
Results: The disc diffusion method on agar containing subinhibitory concentrations of RM and PC. Obtained results indicate that RM, showed significant antimicrobial activities against Gram-positive strains (MIC 0.05%). The mean diameters of growth inhibition by 25%, 50%, PC per well were 2.1, 2.6 and 2.3 cm, respectively. The RM extract was more active than the PC ($P < 0.01$).
Conclusions: In conclusion, RM had a strong activity against impetigo bacterial strains. Our work highlights the need to explore mixtures of natural products for treating microbial infections.

Experimental Therapeutics and Toxicology

Abstract Code: 017

Vitamin E and Lactobacillus provide protective effects against liver injury induced by HgCl2 in rats: role of CHOP, GPR87, and mTOR proteins.

Student(s) Name: *Waad N. AlHuqbani, Shahad M. AlGhilani*
Supervisor(s) Name: *Ahlam M. AlHusaini*

Abstract:
Background: Mercury is one of the most hazardous heavy metal and its toxicity causes severe multi-organ dysfunction. It is broadly found in many ecological and certain occupational settings which leads to an increase in human exposure. Substantial effort has been made to address this issue. This study was designed to explore novel molecular pathways involved in the protective effect of vitamin E (Vit-E) or/and lactobacillus plantarum (Lac-B) against mercury-induced hepatotoxicity.
Methods: Male rats were administered an acute dose of mercuric chloride (HgCl2) then treated with Vit-E or/and Lac-B along with HgCl2. Focusing on their anti-apoptotic, anti-oxidative stress, and anti-inflammatory efficacies. Histopathological examinations were also conducted.
Results: The administration of HgCl2 induced liver injury by elevating the serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Liver lipid peroxidation, cysteine–aspartic acid protease 3 (caspase-3) and tumor necrosis factor alpha (TNF-α) levels were markedly increased; whereas, reduced glutathione (GSH) level and superoxide dismutase (SOD) activity were declined.
HgCl2 significantly elevated the expressions of hepatic CCAAT-enhancer-binding protein homologous protein (CHOP), G protein-coupled receptor 87 (GPR87), NF-κB and mammalian target of rapamycin (mTOR). Histopathological examination revealed massive hepatocyte degeneration and increased collagen deposition. Treatment with Vit-E or/and Lac-B improved liver function, suppressed oxidative stress and reduced TNF-α and caspase-3 levels. Moreover, they reduced the hepatic proteins' expressions of CHOP, GPR87, NF-κB and mTOR, and improved hepatic architecture.
Conclusions: The combination regimen showed a better protective effect against HgCl2-induced hepatotoxicity via reduction of oxidative stress and inflammation, as well as downregulation of CHOP, GPR87, NF-κB and mTOR proteins' expressions.

Abstract Code: 018

Inflammation and Treatment-Resistant Depression from Clinical to Animal Study: A Possible Link

Student(s) Name: *Lara Faisal Almutabagani And Raghad Abdulaziz Almanqour*
Supervisor(s) Name: *Nouf Mohammed And Jawza Fahad Alsabhan And Abdulaziz Mohammed Alhossan*

Abstract:
Background: The World Health Organization ranks depression as the third leading cause of disability worldwide. Unfortunately, around one-third of depressed patients are considered treatment non-responders. Considerable evidence links inflammation to depression; therefore, we investigated whether inflammation via the JAK/STAT axis contributes to treatment-resistant depression (TRD) .
Methods: For the clinical assessment, a retrospective cohort study was conducted on 665 patients diagnosed with major depression disorder and taking antidepressants. Inflammation was assessed by examining the inflammatory biomarkers and lipids panel. Participants were divided into groups: healthy vs. depressed and treatment responders vs. non-responders. For the experimental method, 35 rats were assigned to stressed and non-stressed groups. Inflammation and stress were induced using lipopolysaccharide (LPS) and CUMS. The antidepressant medication fluoxetine (FLX) was used. Behavioral tests were performed, and the plasma levels of inflammatory and stress biomarkers were measured. P-JAK2/P-STAT3 proteins were detected in the hippocampus via immunohistochemistry.
Results: The results showed differences between the groups' inflammatory biomarkers. CRP levels increased significantly in both analysis: 1) Depressed patients vs. healthy (57.1±82.7 vs. 6.5±11.5mg/dl; $p<0.001$); 2) treatment non-responders vs. responders (61±97 vs. 11.08±7.7mg/dl; $p<0.01$). Similarly, the animal model showed a significant increase in inflammatory and stress biomarkers in the FLX+LPS+CUMS group compared to the FLX+CUMS group: CRP (0.46±0.03 vs. 0.049±0.03pg/ml; $P<0.001$); corticosterone (54.401.02 vs. 45.842.10ng/ml; $P<0.001$). P-JAK2/P-STAT3 expression increased significantly in the FLX+LPS+CUMS group.
Conclusions: Inflammation attenuated the antidepressant effect of fluoxetine in the depressed groups, offering insight into targeting the JAK/STAT signaling pathway, which may be a useful approach to preventing TRD.

Abstract Code: 019

Novel Gold-Containing Anticancer AD152 Induces Cytotoxicity via Oxidative Stress-Mediated Intrinsic Apoptotic Pathway in Triple-Negative Breast Cancer

Student(s) Name: *Ahmed K. Abogosh - Meshal K. Alghanem*
Supervisor(s) Name: *Dr, Ali R. Alhoshani*

Abstract:
Background: Breast cancer is the most prevalent type of cancer worldwide. Among all breast cancer types, triple-negative breast cancer (TNBC) is the most aggressive; it is challenging to treat in diagnosed patients. Therefore, novel anti-cancers for aggressive tumors are critically needed. This study aims to elucidate the mechanism involved in the anti-cancer effect of AD152.
Methods: MTT assay was conducted to evaluate the cytotoxic effect of AD152 on TNBC (MDA-MB-231). Then, cells were treated with AD152 in concentrations of 0.3, 1, and 3 µM for 24 hours to assess apoptosis, oxidative stress, and mitochondrial membrane potential using Flow Cytometry. We conducted qPCR to measure pro-apoptotic, anti-apoptotic, and oxidative stress gene expression. The migration inhibitory effect of AD152 was evaluated using a wound-healing assay.
Results: The IC50 of AD152 was 1.36 ± 5 compared to Cisplatin 24 ± 5.1. The induction of apoptosis was found to be 2.1-folds, 1.7-folds, and 3.3-folds for 0.3, 1, and 3 µM respectively. The values of ROS production were 10.1%, 19.15%, and 34.4%, respectively. The percentage of depolarized cells were 5.3%, 17.2%, and 73.8%, respectively. AD152 inhibited the migration of MDA-MB-231 in a concentration-dependent manner. This was supported by attenuation of anti-apoptotic Bcl-2, induction of pro-apoptotic Bax, and caspase-7, -3, -9 expressions upon AD152 treatment. Data represent the mean ± SEM of three independent experiments and analyzed by ANOVA test.
Conclusions: AD152 demonstrated higher cytotoxic potency than Cisplatin on MDA-MB-231 cells. This cytotoxic effect is through disrupting mitochondrial membrane potential via ROS initiating intrinsic apoptotic pathway.

Pharmaceutical Engineering and Drug Regulation

Abstract Code: 020

Development of inhalable dry powder dosage form containing luteolin NPs for lung cancer therapy.

Student(s) Name: *Dana M. Alnader, Reem I. Alfawzan*
Supervisor(s) Name: *Alanood S. Almurshedi, and Basmah N. Aldosari*

Abstract:
Background: Lung cancer is considered as one of the major causes of mortality and morbidity throughout the world, 452 cases of lung cancer were reported by the Saudi cancer registry in 2014. Luteolin (Lut) is a flavonoid, it's potential activity as antioxidant, antiinflammatory, anticancer, and antiviral have been reported. However, its application in delivery systems is restricted due to limited aqueous solubility and stability. Nanostructured lipid carriers (NLC) are a delivery system with high encapsulation efficiency, drug loading, and stability. They may increase, bioavailability and stability of different compounds, and offer controlled release of encapsulated compounds. In this research, NLC has been developed to overcome this limitation.
Methods: Lut loaded NLCs (Lut-NLCs) were prepared by hot homogenization technique. By using two immiscible phases lipid and aqueous with suitable surfactant, mixing the two phases together using high-speed stirring (Ultra Turrax). The optimized Lut-NLCs were characterized by different in vitro experiments, particle size (PS), polydispersity index (PDI), and entrapment efficiency (%EE) in addition to in vitro release.
Results: The prepared Lut-NLCs showed an average PS, PDI, zeta potential and %EE of 77.83 nm, 0.21, -28.4 and 95.75% respectively. Moreover, slow-release rate of Lut was achieved during 24 h of study for Lut-NLCs.
Conclusions: In conclusion, the result show that Lut-NLCs have advantages and potential for targeted lung cancer therapy.

Abstract Code: 021

Formulation and Evaluation of Dual Drug-loaded PLGA Nanoparticles for Cancer Therapy

Student(s) Name: *Abdulhadi M. Almoghrabi, Abdulwahab K. Alzahrani,*
Supervisor(s) Name: *Abdullah K. Alshememry, Mohd Abul Kalam*

Abstract:
Background: Doxorubicin (DOX) is one of the most active chemotherapeutic agents but its clinical utility is compromised due to cardiac toxicity. Naringine (NAR), a phytochemical, has proven to enhance the efficacy of other chemotherapeutic agents. The co-encapsulation of DOX and NAR into Poly (lactic-co-glycolide)-nanoparticles (PLGA-NPs) is believed to enhance their efficacy and decrease their toxicity.

Methods: PLGA-NPs (F3) and Chitosan-coated PLGA NPs (F4) were prepared via double-emulsion solvent-evaporation. Particle size, polydispersity (PDI), zeta-potential (ZP), and structural morphology of the NPs were determined using Zetasizer and scanning electron microscopy (SEM), respectively. Encapsulation (%EE) and loading (%DL) of both drugs were determined by indirect method. In-vitro drug release was checked in PBS.
Results: The particle size of CS-coated (F4) was slightly higher (360.6-366.8 nm) than those of PLGA-NPs (281.3-302.2 nm) and PDI was 0.445-0.671. ZP of PLGA-NPs (F3) was low positive (1.25-4.69 mV) compared to those of the CS-coated (30.83-35.57 mV). SEM observations indicated the smooth-surfaced NPs when prepared by PLGA only, while slightly rough and fractured surfaced after CS-coating. The %EE of DOX was 60.64-66% (PLGA-NPs) and 63.73-76.26% (CS-coated PLGA-NPs). For NAR, it was 60.5-77.8% (PLGA-NPs) and 65.4-71.8% (CS-coated). In vitro release kinetics revealed a sustained release profile with around 77% and 65% of NAR release at 12 h from F3 and F4, respectively while DOX release at 12 h was higher in F4 (54%) than F3 (37%).
Conclusions: Collectively, our results suggest that the prepared dual drug-loaded CS-coated PLGA NPs can represent a promising therapeutic system for cancer therapy

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Abstract Code: 022

Luteolin loaded vesicular nanocarrier to control breast cancer: *In-vitro* and *ex-vivo* evaluations

Student(s) Name: *Mohammad AlRajhi*
Supervisor(s) Name: *Mohammad AlTamimi*

Abstract:
Background: Breast cancer is a deadly disorder and a global challenge for healthcare system. Conventional therapy results in several serious side effects and low patient compliance. Luteolin is a potential natural anticancer drug with limited aqueous solubility.
Methods: Vesicular systems were prepared using film hydration-rotary evaporation method). The optimized formulation was evaluated for vesicle size, size distribution, zeta potential, % entrapment efficiency, morphological assessment, *in-vitro* drug release, *ex-vivo* permeation and drug deposition (rat model). Finally, the optimized formulation was assessed for cytotoxicity study in MCF-7 and compared with pure drug solution (DS) over period of 24 h.
Results: The experimental design tool was used to select the most robust formulation (OF1). The values of vesicle size (202.4 nm), size distribution (0.118) and zeta potential (-22.4 mV) were optimum for topical delivery. Maximum % EE was attributed to unique features of span 80 (negative glass transition temperature and low HLB values). *In-vitro* release study corroborated slow and sustained release from vesicles. TEM ensured spherical vesicles of OF1. Ex vivo permeation parameters (permeation flux and enhancement ratio) were found to significantly ($p < 0.05$) higher (2 fold) than DS. Drug deposition was also highest in OF1 as compared to drug solution and liposomes. Eventually, the cell cytotoxicity of OF1 exhibited substantially higher than DS when exposed for 24 h against MCF-7 cell lines.
Conclusions: Vesicular nanocarrier is promising method being cost effective, with high patient compliance, safe, and scalable at industrial level to control breast cancer using luteolin.

Others

Abstract Code: 023

Assessing the roles and responsibilities of informal caregivers for adult patients in Saudi Arabia: cross sectional study

Student(s) Name: *Nouf F. Alqahtani*
Supervisor(s) Name: *Saja H. Almazrou*

Abstract:
Background: According to the Ministry of Health (MOH) survey, chronic diseases including diabetes, hypertension and obesity are prevalent. Patients in Saudi Arabia usually seek the assistance of family members or domestic workers e.g. housemaids to perform a wide range of tasks including health related ones. Our aim is to determine healthcare related roles and responsibilities of informal caregivers toward patients.
Methods: Study will be conducted in Saudi Arabia. Data will be collected online. The targeted participants are adults whose living in Saudi Arabia and reported having a caregiver (family or domestic workers).
Results: A total of 336 adults with average age (55-76), 68% female were identified. 28.8% of the sample population found to be literate, also came with 82.1% unemployed, married at 55.4% and lived with spouse and children at 42.8%. We found that (59.8%) of participants receive care from son or daughter. The two main reasons for requesting this care are physical inability to manage health and complicated health condition and multiple medications as represented by 39% of study sample, where the roles of caregivers are mainly in escorting patient to an appointment,

encourage the patient to adhere to a healthy life-style with an average of SD= (2.66), (2.58) respectively.
Conclusions: It becomes clear that the family members are the most important people who provide assistance. Besides that their role in providing care was mild, there were problems that encountered while providing this service indicating the time unavailability of caregivers and inconsistency of this care.

Abstract Code: 024

Lyophilized solid dispersions for enhancement of the aqueous solubility and dissolution of a poorly soluble drug

Student(s) Name: *THIKRA M. Aljamal*
Supervisor(s) Name: *Basmah N. Aldosari , Njoud A. Altuwaijri*

Abstract:

Background: Formulation of solid dispersions (SD) is considered as a successful approach to enhance the aqueous solubility, dissolution rate, and hence oral bioavailability, of poorly water soluble drugs. SD may result in reduced particle size, enhanced wettability and porosity, and conversion of drug particles from crystalline to amorphous state. Drugs, like Indomethacin (IND), that are classified by the Biopharmaceutical Classification System (BCS) as class II drugs (poorly soluble and highly permeable) exhibit low and variable oral bioavailability due to their poor water solubility despite their high permeability.
In this work, lyophilized skimmed milk powder (SKM) was proposed as an inert carrier to develop SD of IND because of its content of casein and whey proteins that possess surface active and solubilizing properties.
Methods: Various SD of IND were prepared using SKM as a carrier and adopting lyophilization technique. All formulations were tested for aqueous solubility of the drug as well as for the dissolution behavior. Differential scanning calorimetry (DSC) and X-ray diffraction (XRD) studies were conducted on selected formulations.
Results: Significant enhancement in the solubility of the drug and in dissolution performance of all SD formulations were observed in comparison to the pure drug. Physicochemical characterization of selected formulations indicated the possibility of conversion of poorly soluble crystalline drug to a more soluble amorphous state.
Conclusions: The results suggested that formulation of SD of IND using lyophilized skimmed milk as a carrier is a promising approach for oral delivery of IND.

Abstract Code: 025

Estimation of Metformin Medication Adherence using Dried Blood Spot Analysis.

Student(s) Name: *Nour M. Almubyedh and Adim S. Almalike*
Supervisor(s) Name: *Nouf M. Aloudah and Bushra T. Alquadeib*

Abstract:

Background: Adherence is critical for clinical outcomes especially in chronic diseases as Diabetes. In Saudi population, non-adherence have been reported to be up to 50%. DBS simplicity have gained wide interest as an adherence assessment tool. Our objective is to develop and validate a Metformin analytical assay using DBS via Ultra–High-Performance Liquid Chromatography-Tandem Mass-Spectrometry to assess medication adherence in patients with type-2 diabetes.
Methods: Metformin was extracted from DBS using the protein precipitation process followed by UHPLC-MS/MS analysis. Afatinib was used as internal standard. Separation was achieved using UPLC-HSS T3 Acquity column and a mobile phase consisting of 10 mM ammonium formate with 0.2% formic acid (solvent A) and acetonitrile with 0.2% formic acid (solvent B). Positive-ion multiple-reaction monitoring mode was used for detection.The assay was fully validated according to USP26 and ICH guidelines. The developed method was applied on 30-µl DBSs from 6 diabetic patients. Serum therapeutic range (0.129-90 mg/L) of metformin was used to determine adherence.
Results: The method was highly selective and showed adequate linearity over the range 8-48 ng/ml and good stability at room temperature, 4°C, and -30°C during 1-month storage. The accuracy and precision values met the acceptance criteria per regulatory guidelines. All measured DBS drug concentrations were within therapeutic MET concentration (Av 6.55±4.64).There was no correlation between the concentration of MET and the daily dose, this may be due to individual variability.
Conclusions: The UHPLC-MS/MS method has successfully fulfilled validation requirements and can be applied for adherence assessment of Metformin in diabetic patients.

Abstract Code: 026

Formulation and physicochemical assessment of luteolin loaded nano lipid vesicular formulations.

Student(s) Name: *Khalid H. Alyahya*
Supervisor(s) Name: *Sultan Alshehri*

Abstract:

Background: Luteolin is a bioactive coas poor water soluble characteristics. Due to poor solubility its therapeutic efficacy is reduced. To overcome these problems, the present study was designed to prepare Luteolin loaded niosomes for the oral delivery. Niosomes is a lipid based vesicle and can encapsulate both hydrophilic and hydrophobic drug.

Methods: The niosomes were prepared by solvent evaporation method using cholesterol, non ionic surfactants (span 20, span 40, span 60, span 80) and phospholipids. The prepared niosomes evaluated for size, PDI, zeta potential, encapsulation efficiency, drug release, antioxidant activity and in vitro cytotoxicity study against lung cancer.

Results: Luteolin niosomes was found in the size range of 200 – 500 nm, with PDI value less than 0.5. The encapsulation efficiency was also found to be between 64.56 – 83.65 %. The formulation prepared with span 60 as surfactant showed the maximum encapsulation efficiency. The selected formulation showed negative zeta potential and further coated with different concentration of chitosan (0.1 % - 0.3 %) to enhance the mucoadhesion. The luteolin niosomes and chitosan coated luteolin niosomes showed significantly ($p<0.05$) higher drug release. The antioxidant and mucoadhesive property results revealed that the chitosan coated niosomes showed significant changes. The cytotoxicity study results revealed that the cell viability assay of tested selected chitosan coated luteolin niosomes has significantly ($P<0.001$)) reduced the IC50 when compared with pure luteolin.

Conclusions: The study revealed that oral chitosan-coated luteolin niosomes as a promising delivery system and may enhance the therapeutic efficacy against lung cancer cell line.

Posters Abstracts

Pharmacy Practice and Pharmacotherapy

Abstract Code: 031

The Impact of Antidepressants Medications on Male Infertility in Saudi Arabia

Student(s) Name: *Donia Mohammed Labani*
Supervisor(s) Name: *Jawza Fahad Alsabhan – Lulu Abduallah Alnuaim*

Abstract:

Background: This study investigates the possible effects of anti-depressive medications on male fertility in Saudis. Taking into consideration the confounding factors such as age, medication history, smoking status and medical history. Several research conducted to study the impact of anti-depressive on sexual dysfunction for patients diagnosed with schizophrenia; however, the correlation between infertility on Saudi male and the use of anti-depressive medications needs to be investigate.

Methods: The objective of this study is to assess the incidence of infertility in Saudi males, who are currently or previously, treated with anti-depressive medications, specifically Selective Serotonin Reuptake Inhibitors and Tricyclic Antidepressants and their impact in semen analysis

Results: The results revealed that the total number of control infertile men group is N=271 patients with mean age 34±SD6.9 years. Most of the patients (n=169) were non-smoker (62.4%). The interpretation results for sperm counts demonstrate that only ten percent of patients (n=27) have sperm count more than hundred million. While most of the patients 44.4% (n=121) have sperm counts between 100 -20 million. Moreover, the other half of patients (n=123) have sperm count less than 20 million. However, only seven patients included on the interfile male group that received antidepressants showed that the age ranged from (35-50) years old. Most of the patients taking SSRI (71.4%) and their total sperm count less than 20 million.

Conclusions: Overall, the effect of antidepressants medication on semen parameters in this research is suggestive but not conclusive data. Therefore, more studies are essential before a clinical conclusion can be drawn.

Abstract Code: 032

The prevalence of using Herbal and nutritional supplements as adjuvant to the treatment among cancer patients in Saudi Arabia hospitals compared to non users

Student(s) Name: *Dana S. Saleh*
Supervisor(s) Name: *Lamya S. Alnaim*

Abstract:

Background: cancer is one among the leading causes of death worldwide. Patients with cancer frequently are using herbal and nutritional supplements with conventional therapy including chemotherapy and radiation. With the aim of reducing side effects of treatment, enhancing immunity, and accelerating cure The aim of this study is to explore the use of herbal and nutritional supplements among cancer patients.

Methods: A crosssectional online survey using a structured questionnaire was conducted on a convenience sample of adult was administered to cancer patients through Social media and word of mouth between November 2020 and January 2021.Study was approved by IRB. Pregnant, <18 years patient and those who received palliative care were excluded.

Results: A total of 150 patient participated. Users of herbal and nutritional supplements was reported as users n=24 (16%), non-user n= 126 (84.%) with significant $p<0.05$.

About 79% of patients obtained benefit from using CAM while 20% haven't. The most common of CAM Used (herbal) was garlic 58%, (Food Supplements) was vitamins 54.2%, (Alternative treatments) was cupping & chiropractic both at 50% There were no unwanted effects from the CAM used. Most common reasons to use CAM were to relieve problem and side effects of conventional treatment (8.3%) and boost body's ability to fight cancer (12.5%).

Conclusions: CAM use is not common among population studied. Main reason for use were disappointentment that conventional treatment is not working and the belief that CAM works more with beliefs & inner self

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Abstract Code: 033

Prevalence of Infusion Reaction Associated with Rituximab in A Tertiary University Hospital: A Cross Sectional Study

Student(s) Name: *Seham R. Almutairi, Raghad A. Alrashed*
Supervisor(s) Name: *Abdullah H. Alzeer, Mona N. Bin Anzan , Lina A. Alfantoukh*

Abstract:

Background: Rituximab is a cytotoxic medication known to cause infusion reactions. In recent years, King Khalid University Hospital (KKUH) implemented a smart pump (AlarisTM) to minimize medication errors. However, despite this implementation, infusion reactions are still occurring.

Our study aims to investigate the prevalence and severity of these infusion reactions. A secondary objective is to establish a data registry to enable future related research efforts.
Methods: This is an exploratory cross-sectional study at KKUH. Data for all patients receiving Rituximab in 2019 and 2020 were collected from medical records, including physicians' clinical notes. Unstructured data were reviewed and categorized based on international standards, literature, and subject matter opinion. The primary outcome was defined as the prevalence and severity of documented rituximab infusion reactions. A secondary outcome is to build a structured data registry for rituximab medication.
Results: In this study, 448 [256 (57%) women and 192 (43%) men] were identified to have a history of rituximab infusion encounter, which generated 1,474 rituximab infusion sessions. Among study population, 83 (5.63%) had a documented infusion reaction graded as follow: [Grade 1, (48.2%); Grade 2, (42.2%); Grade 3, (4.8%.); Grade 4 (4.8%)].Chi-square analysis indicate a significant association between the first dose and developing infusion reaction [$X^2(1, N = 448) = 67, p < 0.001$].
Conclusions: The prevalence of rituximab infusion reaction was 83 (5.63%), and it was significantly associated with the first dose. Finally, we built a data registry to investigate 1,474 rituximab infusion sessions among two years for all ages and indications.

Abstract Code: 034

The Prevalence of Drug-Drug Interactions in cancer therapy and the clinical Outcomes

Student(s) Name: *Afrah M.Almutairi, Hind M.Almalki*
Supervisor(s) Name: *Lamya S.Alnaim, Heba J.Salamah*

Abstract:
Background: When a patient concomitantly uses two or more drugs, a drug-drug interaction (DDI) can possibly occur, cancer patients are at high risk of such interactions because they commonly receive multiple medications. However, the data on the prevalence of DDIs are scarce especially in KSA. Therefor our aim was to evaluate the occurrence of DDIs in cancer patients, and identification of risk factors for these DDIs and the clinical outcomes.
Methods: A retrospective cross-sectional study was conducted in KFMC, Data was Collected from the medical records and phone calls Then patient's drugs was screened for interactions by Micromedex and Lexicomp. Then patient's drugs were screened for interactions by Micromedex and Lexicomp. The data was statistically analyzed using IBM SPSS version 24 statistical program.
Results: In 72 patients (mean age 47; 11 medication) the prevalence of DDIs was 60%, a total of 321 potential DDIs were found. The most common category of interaction was between Supportive care and Drug to treat comorbidity.
According to Lexicomp 137 DDIs was identified 51.8% of them wear categorizes as pharmacodynamics interactions, "C" was the highest level of severity which means monitor therapy. Whilst in Micromedex 94 potential DDIs were found 68.1 % of them wear categorizes as pharmacokinetics interactions, the most category of interaction was classified as major which indicate life-threatening interactions.
Conclusions: Around three in five patients on treatment with cancer therapy presented a potential DDIs. To prevent DDIs Physicians and pharmacists should be more aware of these potential interactions.

Abstract Code: 035

Vaccines to Prevent Coronavirus Disease 2019: A Systematic Review and Network Meta-Analysis

Student(s) Name: *Bashayer F. AlOtaibi , Sara A. AlMuhaini*
Supervisor(s) Name: *Hadeel A. AlKofide*

Abstract:
Background: Coronavirus disease 2019 (COVID-19) has caused more than 2.5 million deaths worldwide. To combat this pandemic, several vaccines have been developed. The aim of this study is to systematically evaluate and compare the efficacy and safety of COVID-19 vaccines.
Methods: A search was conducted using several databases (e.g., MEDLINE and Medrxiv). The search is being updated weekly to assess for new evidence. Two authors independently screened studies, extracted data, and conducted risk of bias assessments using Cochrane risk of bias tool. Randomized trials comparing any vaccine aiming to prevent COVID-19 with any comparator in participants at any age groups were eligible. Primary outcome was a diagnosis of COVID-19, secondary outcomes included binding IgG response and adverse events. Results were combined using aggregate data meta-analysis, as well as a frequentist network meta-analysis.
Results: Eighteen studies with 111,845 participants were included. Majority of studies were of high quality. Number of confirmed COVID-19 cases were lower in the vaccine arm, relative risk (RR)=0.07, 95% confidence interval (CI)=0.04-0.11, I2=0%, p-value<0.001. The network meta-analysis revealed that

both viral vector and messenger RNA vaccines were superior to placebo. Binding IgG antibodies were higher in the vaccine arms. The unsolicited, and solicited adverse events were higher in the vaccine arms, however these events were mostly mild to moderate in nature.
Conclusions: This is the first network meta-analysis to compare COVID-19 vaccines. Further inclusion of future trials is needed to inform best practice in vaccine prevention and clinical research of this highly prevalent disease.

Abstract Code: 036

Clinical and Economic Impact of the use of Infliximab Biosimilar in Inflammatory Bowel Disease in Saudi Arabia: A cross-sectional Study.

Student(s) Name: *Alaa A. Alshaalan, Alanoud Z. Alshabanat*
Supervisor(s) Name: *Ahmad A. Alghamdi*

Abstract:
Background: Biosimilar infliximab offers a potential cost savings as substitute for the original Remicade for treatment of irritable bowel disease in many countries. The objective of this study is to study the clinic and economic impact of the use of Remsima in IBD patients in Saudi Arabia
Method: A retrospective cross-sectional study conducted at KKSUMC in Saudi Arabia, included IBD patients who treated with Remsima, Remicade, or switched from between the two agents during 2019. Demographics, disease activity, treatment duration, and related adverse events collected from the electronic health records. The direct medical costs were calculated using cost data derived from KSUMC business center. Descriptive statistics were performed.
Results: A total of 196 IBD patients were included in the study, with 76% being CD patients and 62% were Anti-TNF naïve. The use of Remicade was higher than Remsima (87%, 13%) respectively. In addition, switching between both agents was reported in 40% of patients. The clinical remission status was reached by 90% in Remicade patients 88% in Remsiam and 93% among patients who switched between both agents. The use of Remicade resulted in 10 ADEs compared to 8 ADEs with Remsiam. The median annual cost was SAR 34,823, SAR 33,013, and SAR 38,260 for patient on Remicade, Remsima, and those with multiple switching respectively.
Conclusion: Infliximab biosimilar may have similar efficacy and safety profile compared to originator. The estimated annual cost of using infliximab biosimilar was slightly lower than originator. Constant switching between both agents may result in higher annual cost.

Abstract Code: 037

Cross-cultural adaptation and validation of the Arabic compliance questionnaire for Rheumatology: A Cross-sectional study

Student(s) Name: *Alanoud S. Almashaan, Fatima A. Alsuwayeh*
Supervisor(s) Name: *Haya M. Almalag, Mohammed A. Omair*

Abstract:
Background: Rheumatoid arthritis (RA) is a chronic autoimmune disease that led to work disability and have a negative impact on patient's life. Management of RA is complex, require multiple drugs, and compliance to therapy plays an important role in improving disease progression. However, there is no standard method to measure RA patient's compliance.
Objectives: The study aims to translate and validate 5-item version of the Compliance Questionnaire for Rheumatology (CQR5) among RA patients in Saudi Arabia (SA).
Methods: Translation process was according to translation guidelines (Beaton, et al). CQR5 translation obtained through forward translation by 5 bilingual individuals and backward translation by certified translator, review by expert committee, then piloted on 15 patients to assess clarity. The survey was then administered twice to adult patients with RA attending rheumatology clinics at KKUH for Cronbach alpha and test-retest reliability testing.
Results: After stepwise translation process the CQR5 was administered to 88 adult RA patients, with mean age of 50, include 90.9% Female and 9.1% male. The translated survey had good reliability with Cronbach's alpha of 0.886 and test-retest correlation coefficient of 0.818. The mean CQR total score was 17.78, High adherence were found to be 84.1% and Low adherence were found to be 15.9% of the patients. Moreover, the most influential question affecting adherence in CQR5 was Q4 "I take my medicines because I have complete confidence in my rheumatologist".
Conclusions: Our findings indicates that the Arabic translated CQR5 is valid tool for measuring patient compliance among RA patients in SA.

Abstract Code: 038

Identification of Adverse Drug Reactions Arising from Subcutaneous Biologic Agents Administered to Rheumatoid Arthritis Patients in Saudi Arabia

Student(s) Name: *Rawan H. Alshehri, Sumayah S. Alomran*

Supervisor(s) Name: *Shiekha S. Alaujan, Fadilah S. Aleanizy*

Abstract:

Background: Biological disease modifying anti-rheumatic drugs (bDMARDs) have been advocated by guidelines as effective therapies for rheumatoid arthritis (RA). However, several adverse drug reactions (ADRs) have been reported in short-term trials. In the long term, limited scientific reports documented rare but severe ADRs such as serious infections or malignancies. So far, there are no local studies that assess subcutaneous (SQ) bDMARDs safety in the management of RA patients. The aim was to identify ADRs associated with the long-term use of SQ bDMARDs and their prevalence among RA patients in Saudi Arabia.

Methods: An observational retrospective cohort was undertaken. Adults with confirmed RA receiving SQ Adalimumab, Etanercept, Tocilizumab, Certulizumab, and Abatacept from January 2015 - 2021 were included from KKUH and KFMC. Demographics, Charlson Comorbidity Index (CCI), bDMARDs data, type of developed ADR, and ADRs causality assessment using Naranjo score (NS) were collected. Descriptive analysis was used.

Results: Out of 337 reviewed visits, 130 eligible patients were included (mean age ± SD; 52 ±13, females; 86.9%, married 77.7%, , mean CCI ± SD; 0 ± 1, residence in Riyadh; 70%). Overall, 31.5% of the sample developed ADRs with SQ bDMARDs, include: skin reactions (10%) and infections (6.2%). The total prevalence of ADRs was 33.6% (Tocilizumab; 40%, Adalimumab; 38%, Abatacept; 33.3%, Etanercept; 29.5%, and Certulizumab; 22.2%).

Conclusions: Skin reactions and infections are the most developed ADRs among RA patients receiving long-term SQ bDMARDs. The safety profile was the lowest with Tocilizumab and Adalimumab.

Abstract Code: 039

Real World Outcomes of Anticoagulant Prophylaxis in Bariatric Surgery Patients

Student(s) Name: *Raghad K. Alshuhayb , Leena F. Albogamy*

Supervisor(s) Name: *Saeed A. Alqahtani*

Abstract:

Background: Thrombosis is a potentially serious complication after bariatric surgery. anticoagulants have been used to minimize this risk. Which anticoagulants should be used and for how much duration is currently unknown. Therefore, this study aims to investigate efficacy and safety of several anticoagulants with different treatment durations.

Methods: Retrospective cohort using data from electronic medical system of tertiary teaching hospital in Riyadh from January-2017 to December-2020. Data were entered in a purposefully designed Excel sheet for this study. Collected data comprised patient demographic data, medication information, and duration. Data were analyzed using SPSS version 22. All categorical data was presented in frequency and percentages whereas numerical data was evaluated as mean standard deviation.

Results: A total of 385 patients taking anticoagulation prophylaxis after bariatric surgery recruited in King Saud University Medical City (KSUMC) with a mean age of 36.8 years (±12.2) were enrolled in this study. (53.5%) were females. Enoxaparin was the most common anticoagulant used in those patients (70.4%). While fondaparinux was the second 24.9%. The rest were used heparin (3.9 %) and warfarin (0.26%). Most of the patients used the anticoagulant for 7 days. The incidence rates of thrombosis and stroke were 0.52 %. The incidence rate of major and non-major bleeding were 0.26% and 1.04% respectively.

Conclusions: Enoxaparin was the most common anticoagulant used in bariatric surgery patients. The most common duration of anticoagulation was 7 days. using anticoagulation prophylaxis was associated with a lower risk of thrombosis, stroke, major bleeding, and non-major bleeding in those patients.

Abstract Code: 040

Methotrexate Dosing and Administration on Tolerability and Efficacy Outcomes in Rheumatoid Arthritis Patients: an Observational Study at a University Hospital.

Student(s) Name: *Sahar Alshehri and Asma Alsadaawi*

Supervisor(s) Name: *Haya M. Almalag, Ghadah Assiri And Mohammed Omair*

Abstract:

Background: Methotrexate (MTX) is a cornerstone medication in the management of rheumatoid arthritis (RA). To reduce MTX GI side effects, splitting the dose and shifting oral to subcutaneous was suggested. Our study aimed to assess the effectiveness, safety, and tolerability of MTX split dosing regimen and comparing the outcomes with the standard MTX regimen.

Methodology: A cross-sectional survey was distributed to adult RA patients receiving MTX therapy. Patients were recruited from rheumatology outpatient clinics at KSUMC. The survey was

predesigned to collect demographics and outcome variables: MISS, HAQ and pain. Patients receiving split dose MTX were compared to those receiving standard dose on univariate analysis.

Results: Data of 55 adult patients receiving MTX therapy were explored. Most of them were female (n=51) 92.7%, with mean (SD) age of 54 (SD10) and (n=13) 25.5% using split dose regimen. Patients on split dose and standard dose were mostly tolerant with (n=7) 53.8%, (n=23) 54.8% respectively, with no significant difference between groups (p=0.601). With regards to disability, patients with split dose had the worst outcome with a median (IQR) of 1.625 (1.250-2.375) when compared to standard regimen 1.250 (0.875-1.625) but wasn't significant. In addition, patient on split dose also had the worst pain score of median (IQR) 50 (40-70) when compared to standard regimen 45 (40-60) with a nonsignificant p value (0.177).

Conclusion: Up to this point, no significant difference in terms of tolerance or disease disability between standard regimen and split dose. Higher prevalence of pain with split dosing regimens was found.

Abstract Code: 041

Chronic Myeloid Leukemia outcomes management in Saudi Arabia

Student(s) Name: *Yasir Dhafer Alshehri and Turki Saad Alotaibi*

Supervisor(s) Name: *Nora Abdullah Alkhudair*

Abstract:

Background: Chronic Myeloid Leukemia (CML), is a cancer of the myeloid precursor cells with high mortality rates historically due to the lack of targeted therapies. In early 2000's Tyrosine Kinase Inhibitors (TKIs) were introduced to control CML chronically. Thus, subsequently improved 10-years overall survival from ~20% to 80-90%. Appropriate initiation of TKIs is dependent on patient's disease phase and comorbidities. Adherence is crucial to maintain disease control. Our aim is to assess CML management and patient's quality of life (QoL) among our population.

Methods: A retrospective-prospective cohort study, approved by Institutional Review Board at KSUMC from the year 2015 – 2020. All patients ≥ 18 years-old diagnosed with CML, who are actively on TKI's were included. Study variables were collected retrospectively, from Electronic Health Record. Prospectively, phone calls were conducted to assess QoL using QLQ-3.0, adherence using MARS, and adverse events (AE) direct assessment. The statistical analysis was preformed using STATA.

Results: Twenty-four patient were included, and 95% received Imatinib at initiation. One patient achieved Major Molecular Response (MMR) at 3 months. Subsequently, 29.2% and 50% achieved MMR at 6 and 12 months, respectively. Beyond one-year, MMR was achieved in 79.2% of patients. Common AE included; musculoskeletal pain, nausea, fatigue and headache. low-adherence to TKIs identified in 43%. The mean global health status score was 76.09±18.85.

Conclusions: Our patient population demonstrated low-adherence and delayed MMR. A larger sample is warranted to assess its impact on QoL. Activating pharmacist-led oral chemotherapy clinics is an essential step to improve CML management.

Abstract Code: 042

Evaluating model-based dosing of vancomycin in adult ICU patients

Student(s) Name: *Ahmed F. Aldafiri, Abdullah W. Alshibany*

Supervisor(s) Name: *Abdullah S. Alsultan*

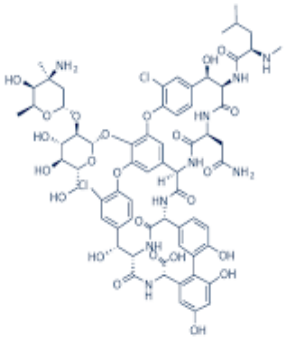
Abstract:

Background: Vancomycin is glycopeptide antibiotic used for gram positive infections. It is commonly used in the ICU to treat hospital acquired infections. Its efficacy linked to an AUC/MIC > 400. Patients in the ICU have high variability in pharmacokinetics due to pathophysiological changes. Our objective is evaluating the model-based dosing on adult ICU patient.

Methods: Data was retrospectively for 107 adult patients admitted to ICU at KSUMC and received vancomycin. Patients were included if they had at least 1 measured vancomycin serum concentrations at steady stat. Data collected by using electronic medical records from KSUMC. Variables to collect include age, weight, gender, organ function, lab values, dosing and drug concentration. We estimated the total body clearance for each patient using a Bayesian approach. Then we compared 3 different dosing approaches, clinician recommended dose, model-based dosing using vancomycin calculator software and the Koti model. For each dosing approach, we determined the percentage of patients who achieved the therapeutic target of an AUC =400-600 where the AUC=total daily dose/Cl.

Results: A total of 107 patients were included in the analysis with average (±SD) age of 51.2±18,41, weight 72.6±22.95 and height of 161.2±10.50 were from ICU wards. The percentage of patients who reach the target of an AUC (400-600) in dosing software was 28%, clinician recommended dose 23.3% and the Koti model was 26.2%

Conclusions: Using model-based dosing did not improve target attainment for vancomycin in critically ill patients



Abstract Code: 043

Pharmacokinetics of Meropenem in critically ill patients

Student(s) Name: *Abdullah A. AlAhmadi, Turki A. AlJaloud*
Supervisor(s) Name: *Abdullah S. AlSultan*

Abstract:

Background: Meropenem is a broad spectrum antibiotic commonly used for the treatment of severe infections in critically ill patients. These patients are at increased risk of developing infections caused by drug resistance bacteria. In addition, critically ill patients have high variability in pharmacokinetics and are at increased risk of having sub therapeutic concentrations. Our objective is to study the pharmacokinetics of meropenem in Saudi critically ill patients.

Methods: This prospective observational study was conducted at the ICU of KKUH, two blood samples were collected from each patient; a peak 1-hour after the end of the infusion and a trough 30 minutes before administering the next dose at steady state. We evaluated the percentage of patients who achieved the PK/PD therapeutic target of free trough concentrations 4 times the MIC. We set the MIC at 2ug/mL according to the EUCAST breakpoint.

Results: Our study included 55 critically ill patients. Average Serum Creatinine (SD) was 175.30 (136.38), average weight was 71.56 (20.66), average age was 64 (18.76) and 52.72% had a septic shock. Only 58 % (32) of our patients achieved the therapeutic target of free trough concentrations 4 times the MIC.

Conclusions: Current dosing of meropenem in critically ill patients results in sub therapeutic concentrations. Ideally we should target dosing that achieves therapeutic target in > 90% of patients. Dosing should be optimized based on PK/PD using extended or continuous infusion with or without TDM to improve target attainment and treatment outcome.

Abstract Code: 044

Glycemic Control and Management in Pharmacist-led Diabetic Clinic versus Physician-led diabetic Clinic

Student(s) Name: *Abdulmohsen K. Almuwayjid – Mohammed S. Almadi*
Supervisor(s) Name: *Sultan M. Alghadeer, Bashayr M. Alsuwayni*

Abstract:

Background: Despite the noticeable benefits of clinical pharmacist in managing diabetes, some institutions in Saudi Arabia are reluctant to establish a pharmacist-led diabetic clinic for monitoring and follow-up. This study was conducted to investigate the difference in management of diabetes mellitus between the patients followed in the pharmacist-led diabetic clinics versus those followed in physician-led diabetic clinics.

Methods: Retrospective observational study with 18 months follow-up were used to detect the difference in the glycemic control by comparing the reduction in hemoglobin A1c percentage from the baseline, and average changes in A1c, FBG, BP, and lipid panel between the two groups. The level of self-care was assessed by Summary of Diabetes Self-Care Activities (SDSCA) Questionnaire.

Result: A total of 52 patients were included in the study (24 and 28 patients followed by pharmacist- and physician-led clinic respectively). The median reduction of A1c from the baseline was significantly higher among pharmacist- versus physician-led clinic (2.05 versus 0.02; p= 0.04). The number of follow-up visits was significantly higher in the pharmacist-led clinic (average 5 versus 3 visits; p=0.0005). The self-care assessment showed better outcomes among patients followed by pharmacist in most aspects (diet, exercise, foot care, and blood-glucose testing). The average change in A1C (8.67 versus 8.56), FBG (9.51 versus 9.14), SBP (134 ±10.06 versus 136.38 ±15.51) and LDL (2.41 versus 2.07) were not statistically significant between the two groups.

Conclusion: Pharmacist-led diabetic clinics for glycemic control and follow-up showed efficient results that encourage the comprehensive and integral inter-professional patient care.

Abstract Code: 045

Assessing the content and format of outpatient medication label in Riyadh's major hospitals: A cross sectional study

Student(s) Name: *Saleh M. AlHazmi, Saleem* **A.** *AlZahrani*
Supervisor(s) Name: *Azher M. Arafah*

Abstract:
Background: Proper and informative medication labeling practices are important to ensure safe medication use. Drug labels provide firsthand information to the patients as well as provides a unique identity to the prescribed medication. Insufficient and confusing information on labels are recognized as big hurdles in standard labeling practices. The main objective of the study was to assess and compare the content and format of outpatient medication labels in Riyadh's major hospitals.
Methods: A cross-sectional comparative analysis study was conducted from June 2020 to January 2021 among 19 hospitals in Riyadh, Saudi Arabia. A total of 19 outpatient medication labels were collected and assessed by using Institute for Safe Medication Practice guideline. The tool is divided into three sections: Identification, label Instructions, and layout. To protect the confidentiality, no patient-related information was obtained.
Results: Out of total labels collected the study showed 46.7% were complying with identification, 64.72% with label instructions, and 40.36% with the layout. Overall, 53.51% of hospitals complied with all the 31 indicators assessed.
Conclusions: We conclude that labels from the major hospitals in Riyadh do not fully comply with standard labeling practices. Although many of the labels were appropriate in identification indicators but were not in compliance with regard to other indicators. The implementation of single and ideal labeling standards nationally is needed to improve the labeling practices in the kingdom.

Abstract Code: 046

Comparative effectiveness and safety of rivaroxaban with vitamin K antagonist among atrial fibrillation patients with impaired liver function in a tertiary center, Riyadh

Student(s) Name: *Abdulaziz O. Almutairi, and Moath A. Alkhuzaim*
Supervisor(s) Name: *Azher M. Arafah, Mohammad H. Aljawadi, Bashayer M. Alsoowaynee, and Muneeb U Rehman*

Abstract:
Background: The data about the use of anticoagulant therapy in atrial fibrillation patients with impaired liver function are not well known, due to the exclusion of this population from RCTs and abnormal coagulation process in those patients. Thus, they might need additional dosing and monitoring criteria.
Methods: A retrospective cohort study of all patients with atrial fibrillation in KKUH, (2018 - 2020)
Inclusion criteria: All patients (> 18 years) diagnosed with atrial fibrillation and received either rivaroxaban or warfarin with or without impaired liver function. Data extracted from electronic health records (eSiHi), entered in an excel sheet, and analyzed using Stata Software.
Results: Overall, 160 patients were obtained, with a mean age of 68 years, 65% were female, 69.4% had hypertension, diabetes mellitus (48.8%), 26.9% with impaired liver function, and 50.6% were on warfarin therapy. Number of stroke and bleeding events were 36. In bivariate analysis, patients with impaired liver function has higher risk of stroke or bleeding (P = 0.023). In multivariable Cox PH regression, patients with impaired liver function and on warfarin therapy has higher risk of stroke or bleeding [hazard ratio (HR) 15.2 (CI (95%): 2.07, 111.61) (P = 0.007)], also for patients with myocardial infarction [(HR) 5.68 (CI (95%): 1.39, 23.15) (P = 0.015)] and transient ischemic attack [(HR) 28.3 (CI (95%): 1.53, 523.68) (P = 0.025)].
Conclusions: Our findings showed that patients on warfarin therapy with atrial fibrillation and had impaired liver function has higher odds of getting either stroke or bleeding.

Abstract Code: 047

Assessment of Health Care Provider Adherence to Hypertension Guidelines in a Tertiary Hospital

Student(s) Name: *Abdulmalik F. binrasheed & Mohammed K. Almutairi*
Supervisor(s) Name: *Abdulaziz M. Alhossan*

Abstract:
Background: Hypertension is a chronic disease characterized by resistance of arteries wall against blood flow, while heart pumps increased, eventually may cause damage to major organs. The purpose of Hypertension guidelines is to help healthcare providers make the right decision by providing evidence in the available treatment options (e.g., ACC/AHA). There are studies that applied to assess physician utilizing and adherence to hypertension guidelines. Our main objective in the study was to assess adherence to evidence-based guidelines in hypertension management and to ensure better therapeutic outcomes and safe practices.
Methods: A cross sectional retrospective chart review study for hypertensive patients at KSUMC between October 2020 and January 2021. Demographics data were collected and included (weight, age, gender, race

and comorbidities) as well as antihypertensives and whether they are prescribed appropriately based on (ACC/AHA) guidelines. First line options and existing of comorbidities were used to determine guidelines-adherence prescribing patterns.

Results: Overall, 357 hypertensive patients were included in the study in which 55% of participants were female and average age was 62 years. More than half of the sample (58.3%) have diabetes and 58% have dyslipidemia. One third of our sample (112 patients) were on inappropriate antihypertension regimen. Out of the 208 diabetic patients, 76 were not on first line recommended treatment.

Conclusions: We found a remarkable percentage of patients were on inappropriate regimens which indicates a high risk of uncontrolled hypertension or complications. More attention to guidelines adherence is important to update all practitioners and make sure safe practices are applied.

Abstract Code: 048

The association of long-term use of metformin on vitamin B12 deficiency among Saudi population

Student(s) Name: *Abdulelah M. Aljadhee, Mohammed A. Alqahtani*
Supervisor(s) Name: *Abdulaziz M. Alhossan*

Abstract:

Background: Metformin is a medication from biguanide class, it's used as the first line treatment for DM type 2. The association between Metformin and Vitamin B12 deficiency and the risk of peripheral neuropathy have been reported in several studies. Here in our study we aimed to investigate this association among Saudi population and assess the risk of deficiency.

Methods: A retrospective cross-sectional chart review of 1,021 diabetes patients who visited the ambulatory care clinic in King Khalid university hospital from Jan2020 to Mar2020 was conducted. The inclusion criteria were: Saudi adult patients who have type 2 diabetes and on metformin and have a Vit B12 level recorded in the system.

Results: Overall, 253 patients met the inclusion criteria in which 67% were Female. And 33% were Male in addition to diabetes, 53% of the participants had hypertension and 59% had Dyslipidemia. Vitamin B12 deficiency was detected in 3% of the sample. In addition, 37% of our sample were taking Multivitamin complex which had Vitamin B12 in them and 21% of them were on Vitamin B complex.

Conclusions: The study did not find strong relationship between vitamin B12 deficiency and being on metformin as only 3% had low vitamin B12. There are several possibilities for this, one can be due to the fact that most physicians and patients had a good knowledge about this risk and were prescribed vitamin supplements. Also, the length of metformin use was not available to us which may be a strong factor.

Abstract Code: 049

PharmD students' knowledge, attitudes and factors influencing in selection and dispensing of generic medicines.

Student(s) Name: *Abdullah M. Almutairi , Abdullah F.Almogren*
Supervisor(s) Name: *Mohammed N. Al-Arifi*

Abstract:

Background: Consumptions of the drug is viewed as a huge factor that leads to rising medical services and its cost. Although evidence suggested that generic replacement with branded medicine has become a typical practice among registered pharmacist all over the world

Purpose: The aim was to determine PharmD students' knowledge, attitudes and factors influencing in selection of generic medicines.

Methods: A descriptive, cross-sectional study was conducted through google forms to collect the data to achieve study objectives. The data was collected over a period of 3 months using self-reported questionnaires.

Results: Majority of the students (70.2%) were able to define the term generic medicine, about 65% of them were correctly identified the bioequivalence definition. More than half of the students (56.5%) were lacked the knowledge about pharmacokinetics parameters of generic product. Most of students (85%) agreed to support generic over branded. About 66% of students agreed that wider use of generic medicines would mean that less money required for research and development of new pharmaceuticals. Most of students (64%) agreed that use of generic medicines would result in decrease in health care expenditure by the government. about 60 % reported that pharmacists should be allowed to perform generic substitution without consulting the prescribing physician. the most influencing factors for generic prescribing were cost to customer (80.1%,), and availability of policies, laws and regulations (69.6%).

Conclusion: Findings revealed that pharmacy students had acceptable responses towards knowledge of generic medicine. Although in some aspects of generic drugs students lacking the knowledge

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Abstract Code: 050

The enhanced antitumor activity of Gefitinib using pH sensitive liposomes.

Student(s) Name: *Mohammed Firas E. Mahayri*
Supervisor(s) Name: *Mohammed M. Badran*

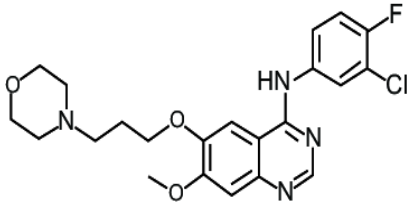
Abstract:

Background: The antitumor drugs face many challenges, they exhibited low specificity, which often limit their use. Therefore, pH-sensitive liposomes (PSL) were fabricated for tumor-targetability and improved therapeutic efficacy of anticancer agents. Therefore, gefitinib (GFT) loaded PSL could enhance its therapeutic outcome against human non-small cell lung cancer (NSCLC).

Methods: In this study, PSL was constructed containing cholesteryl hemi-succinate (CHEMS) and phosphatidylethanolamine (PE). The PSL were compared with cationic liposomes (CLP) using stearyl amine and classical liposomes (LP). GFT-loaded PSL, CLP and LP were prepared using the thin-film hydration method and characterized for appropriate physiochemical properties in term of particle size, polydispersity index (PDI), zeta potential drug and entrapment efficiency (EE%) and stability. The in vitro release profiles were investigated using different pH 7.4 and pH 5.5. Moreover, anticancer activity was evaluated on NSCLC using MTT assay.

Results: PSL showed proper physiochemical properties, including particle size of approximately 200 nm, high EE% of GFT-loaded PSL compared to GFT-loaded CLP and LP. Stability data showed that PSL, CL and NL were physically stable for 1 month at 4 °C. PSL displayed good pH-sensitive release performance with sustained release of GFT at pH 7.4 and rapid release in pH 5.5. The in vitro anticancer activity revealed that PSL magnified the antitumor activity of GFT toward lung cancer cell line compared to CLP and LP.

Conclusions: Results indicated GFT-loaded PSL is a promising antitumor delivery system for cancer therapy, especially lung cancer, which could improve drug efficacy, however further animal study is still required.



Gefitinib

Abstract Code: 051

Pharmacokinetics of Rivaroxaban in Bariatric surgery

Student(s) Name: *Arwa A. Alzahrani and Manar S. Basoodan*
Supervisor(s) Name: *Saeed A. Alqahtani*

Abstract:

Background: Obesity poses an epidemic issue as one of the most critical contributors to morbidity and mortality among all health-related problems. Certainly, bariatric surgeries are considered as well-established treatment options for patients who failed other weight loss therapies. The risk of Venous Thromboembolism (VTE) is critically elevated after bariatric surgeries which demands the use of anticoagulants. Our aim from the study is to assess the pharmacokinetics parameters of Rivaroxaban following bariatric surgeries.

Methods: A prospective observational study conducted at KKUH in Riyadh, Saudi Arabia. The study includes seven obese patients who were admitted for bariatric surgery and intended to receive prophylaxis doses of Rivaroxaban. High performance liquid chromatography (HPLC) was used to determine pre and postoperative Rivaroxaban plasma concentration and processed with UV detection system.

Results: Seven patients were included in the study in which 43% is male. The average age was 29.3 ± 8.3 years and the mean body weight was 122.4 ± 23.8 kg. The average maximum concentration (Cmax) was 0.3 ± 0.1 µg/ml & 0.23 ± 0.21 µg/ml pre- and post bariatric surgery, respectively. There was no statistical significance between the measured levels of rivaroxaban.

Conclusions: In this study, we reported the pharmacokinetic parameters of Rivaroxaban in bariatric patients. The findings of this study showed that there is no statistical significance between pre and post levels of Rivaroxaban. Waiting to complete the study in order to have a clear interpretation about the pharmacokinetics in these particular patients.

Social Pharmacy and Pharmaceutical Outcomes

Abstract Code: 052

Use of Self-Medication among Adults in Saudi Arabia and its Association with Chronic Health Conditions

Student(s) Name: *Shatha A. Bin Malik, Leena K. AlSwailem*
Supervisor(s) Name: *Muneera M. Alwhaibi, Yazeed S. Al-Ruthia*

Abstract:
Background: Adults who self-medicate may be at risk of improper use of medication and side effects, especially those with chronic health conditions. Therefore, this study assessed the prevalence of self-medication among the Saudi adult population, reasons for self-medication, and its association with chronic health conditions.
Methods: A prospective cross-sectional study using a developed questionnaire was conducted among 1,362 adults in Saudi Arabia, response rate was 82.8%. Descriptive statistics were used to describe study findings. All statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS Inc, Chicago, IL, USA).
Results: Overall, 72% reported practicing self-medication in the past 6 months. Self-medication was higher among younger age, women, those with higher education level, high income, and working in the health field (P-value<0.0001). About 198 practiced self-medication for chronic health conditions; with high cholesterol and hypertension being the most common. Self-medication was most commonly used for headache, body pain, and muscle pain. The main reported reasons for self-medication were having previous experience with the illness (25.7%) and time saving (22.6%). Adverse events (AEs) were reported by 15% of self-medicating individuals; with constipation and nausea being the most common AEs.
Conclusions: The high prevalence of self-medication among the adult population in Saudi Arabia has a strong association with existing chronic health conditions, making it an important health issue. As a result, an expected increase in AE can occur. Therefore, there is a need for education on the safe use of self-medication in adults with chronic health conditions in Saudi Arabia.

Abstract Code: 053

Virtual institutional introductory pharmacy practice experience (IPPE) from students and interns perspective

Student(s) Name: *Lama H. Alotaibi*
Supervisor(s) Name: *Omar A. Almohammed*

Abstract:
Background: The COVID-19 pandemic has required governments around the world to suspend face-to-face learning for school and university students. Colleges of pharmacy are faced with the challenge of training students in hospitals that are under considerable pressure at this time. This study describes the experience of the Introductory and Advanced Pharmacy Practice Experience (IPPE and APPE) students engaged in the virtual IPPE training.
Methods: A cross-sectional study was conducted to describe and appraise the implemented virtual IPPE training from the experiences of IPPE and APPE students. The IPPE students described their experiences in close-ended questionnaires, while APPE students described their experiences in open-ended questionnaires. The study focused on highlighting the advantages, opportunities, challenges, and shortcomings of the virtual training.
Results: The IPPE students' experiences, based on 87 respondents, were mostly positive. Although IPPE students enjoyed the time flexibility that allowed the learning of new skills and reflection on previous experiences, 15% experienced difficulty finding quiet places with a reliable internet connection or had difficulty working on team-based activities. Moreover, some were anxious about the lack of adequate patient-care experience. On the other hand, the APPE students found the experience enriching as they gained experience and understanding of academic workflow, gained skills, and overcame the challenges they faced during this virtual training experience.
Conclusions: Future training programs should be organized to overcome the challenges and maximize the benefits of training experiences. Pharmacy schools may benefit from the training materials constructed, prepared, and administered by APPE students to improve IPPE students' learning experiences and outcomes.

Abstract Code: 054

The Cost-effectiveness of Orally administered Agents versus Interferon-Based Therapy in the Management of Relapsing-Remitting Multiple Sclerosis: A Single Center Study

Student(s) Name: *Abdulmalik Alajlan and Suliman Aldhafiri*
Supervisor(s) Name: *Yazed AlRuthia*

Abstract:
Background: The very fact that Multiple sclerosis (MS) is un-curable and necessitates life-long care makes it one of the burdensome illnesses. The aim of this study was to examine the cost effectiveness of orally administered medications (e.g., fingolimod, dimethyl fumarate, and teriflunomide) versus interferon (IFN)-based therapies in the management of relapsing-remitting multiple sclerosis (RRMS) in Saudi Arabia.
Methods: This was a retrospective cohort study in which patients with RRMS aged ≥18 years without any other chronic health conditions with complete data for at least 12 months were recruited from the

electronic health records of a university-affiliated tertiary care center. The Incremental Cost Effectiveness Ratio (ICER) was calculated based on the acquisition cost, lab tests, imaging studies, administration cost, and frequency of clinic visits per each event prevented as a composite outcome (e.g., relapse, lesion development on MRI, disability progression).

Results: The number of patients who met the inclusion criteria and were included in the analysis was 78. The mean age of the patients was 32 years, and 70.51% of them were female. There were 33 patients on the orally administered agents, and 45 patients on IFN-based therapy. The ICER for the use of orally administered agents was SAR -909,117.21 for each event prevention. The use of orally administered agents would result in lower cost and better outcome 63.19% of the time

Conclusions: The use of orally administered agents in the management of RRMS among young patient population has shown to be more cost effective in comparison to IFN-based therapy.

Abstract Code: 055

Saudi Pharmacists Communication Skills With Deaf and Hearing Impaired Patients - A Needs Assessment

Student(s) Name: *Maram H. Alanazi , Norah M. Alotaibi*

Supervisor(s) Name: *Nuha A. Alaloola*

Abstract:

Background: In Saudi Arabia, around 1.4% of Saudi population have disabling hear loss, with 0.4% having deafness. Pharmacists play important role in improving medication literacy of deaf and hard of hearing (HOH) patients. However, there is lack in research assessing the Saudi pharmacists perception of their responsibilities towards deaf and HOH patients, their current practice, and their needs for communication skills training. This research assessed the need for pharmacists communication skills training program with deaf and HOH patients from perspectives of pharmacists.

Methods: A cross sectional study involved 303 pharmacist working in Saudi Arabia. A validated structured, pilot-tested, self-administered, online questionnaire was used to collect the data. Data were analyzed using SPSS version 21, and descriptive statistics were used to describe the study findings.

Results: Most pharmacists perceived that deaf and HOH patients having difficulty in understanding their medications instructions correctly 69%. Writing was the most common method used for communication 68.3%, whereas unavailability of interpreter 53.5% and low reading level of those patients 37.6% were the most barriers of communication reported by pharmacists. Moreover, 61.7% of pharmacists perceived that pharmacists should be skilled and been able to communicate with deaf and HOH patients. However, 49.8% of pharmacists feel that they are not well prepared to communicate with those patients. In addition, 63.7% of pharmacists showed their need for training program, and 81% were willing to participate in such programs.

Conclusions: This research describes the need of pharmacists for a program of communication skills with deaf and HOH patients.

Abstract Code: 056

Psychological and behavioral impact of COVID-19 outbreak on patients with Rheumatoid arthritis

Student(s) Name: *Jumanah.M. Alkendi, Shahad.M. Alshehri.*

Supervisor(s) Name: *Shiekha.S. Alaujan, Haya.M.Almalaq*

Abstract:

Background: Since Nov 2019, the COVID-19 outbreak became a major concern especially in patients on immunosuppressant's including Rheumatoid arthritis (RA). Moreover, the outbreak has a significant impact on the medication taking behavior, quality of life and psychological wellbeing. This study aims to assess the impact of COVID-19 outbreak on the disease activity, quality of life, psychological, and behavioral status in RA patients.

Method: A cross-sectional study (August-November 2020) involving adults with RA was conducted at KKUH and KFMC. A survey was used to collect patients' demographics, medications taking behavior, and outcomes measures using three Arabic validated tools; Hospital Anxiety and Depression Scale (HADs), Health Assessment Questionnaire (HAQ), and EQ-5D-3L. Univariate parametric and non-parametric analysis were performed.

Results: A total of 204 RA patients enrolled with 28% were 41-50 years old, females (86.5%), married (77.3%), unemployed (70.7%), bachelor degree (40.0%), had psychological illness (15%), and use hydroxychloroquine as preventive therapy (2.5%). The HADs showed that 12.3% and 20.1% were with borderline and abnormal anxiety, respectively. The median HADs depression (IQR) was 6 (6-8), 4 (3-6), and 1 (1-2) in high, borderline, and normal anxiety, respectively (p-value <0.001). The EQ-5D-3L mean index score (SD) was 0.292 (0.392), 0.508 (0.320), and 0.702 (0.325) in high, borderline, and normal anxiety, respectively, (p-value <0.001).

The median HAQ disability index (IQR) was 1.875 (1.250-2.250), 0.500 (0.375-0.750), and 0.625 (0.500-1.750) in high, borderline, and normal anxiety, respectively (p-value <0.001).
Conclusion: Psychological status, quality of life, and disability were affected significantly in RA patients. Minority used hydroxychloroquine for prevention.

Abstract Code: 057

Pictograms and parents' readability of leaflets of pain medications intended for pediatrics use - A quasi-experimental study

Student(s) Name: *Sarah Khader Sayed*
Supervisor(s) Name: *Omar Abdulrahman Almohammed*

Abstract:
Background: Parents often have difficulty determining the correct dose of medication for their children. This study sought to assess parents' comprehension of patient information leaflet (PIL) and examine the impact of using pictograms in PIL on participants' comprehension.
Methods: A quasi-experimental study was conducted including parents/caregiver (> 18 years), speaking Arabic and taking care of at least one child (<13 years). Participants were distributed into PIL with pictograms and PIL without pictogram groups. A questionnaire was developed for the purpose of the study and pre-validated pictograms were used. Chi-square, Wilcoxon-rank sum-test, and logistic regression were used for statistical analysis.
Results: 130 parents/caregiver were enrolled (64 in the PIL with pictograms and 66 in the PIL without pictograms). Female represented 50.7% of participants, with most being young (25—34 years; 45.3%). Participants in the group with pictograms had better level of health literacy, but that did not reach significance. Participants in the pictograms group had better comprehension than participants in the other group (p<0.014). After controlling for the effect of age, gendar, and health literacy in the logistic regression, the pictograms group were four times more likely to comprehend the instructions on PIL compared to the group without (OR=4.05;95%CI 1.65–9.96). Participants with higher score on the health literacy scale were more likely to respond correctly (OR=1.53; 95%CI 1.14–2.05).
Conclusions: The study revealed a positive impact for the use of pictograms in PIL on parents/caregivers' comprehension for medication information. Future studies should focus on strategies to utilize pictograms in PIL.

Abstract Code: 058

Patients' Behavior Towards Natural Products and Supplements Before and During COVID-19 Infection Among Recovered Patients

Student(s) Name: *Leen Aldwihi*
Supervisor(s) Name: *Omar Almohammed*

Abstract:
Background: Since the declaration of the coronavirus disease-2019 (COVID-19) as a pandemic, the world struggled to overcome COVID-19 infections. This study investigates the change in patients' behavior towards natural products or supplements before and during infection with COVID-19 and their association with hospitalization.
Methods: A cross-sectional, questionnaire-based study was conducted enrolling symptomatic patients who have recently recovered from COVID-19 in Saudi Arabia. Data were collected through phone interviews. Chi-Square and McNemart's tests and multivariate logistic regression were used in the analysis.
Results: A total of 738 patients were included in the study; 501 were non-hospitalized and 237 required hospitalization. About 57% of participants were male, and the mean age and BMI for participants were [36.5±11.9] and [28.4±7.1], respectively. The use of lemon/orange, honey, ginger, vitamin C, and fennel flower among the patients have significantly increased during their COVID-19 infection. Whereas patients who were using star anise, mint, and coffee peel before their infection were more likely to stop using them during their infection. In the multivariate logistic regression, only the use of vitamin C (OR=0.51; 95%CI 0.33–0.79), mint (OR=0.53; 95%CI 0.31–0.90), and lemon/orange (OR=0.54; 95%CI 0.33–0.88) was associated with a significant reduction in the odds of being hospitalized for COVID-19 treatment.
Conclusions: The study reveals that patients' consuming behavior for natural products and supplements changed with their COVID-19 infection, hospitalized patients were less likely to have used these natural products; thus, these products or their active components can be further investigated as feasible options for COVID-19 treatment.

Abstract Code: 059

Role of electronic health literacy in glycemic control of patients with diabetes mellitus type 2

Student(s) Name: *Abdullah N.Almajed*
Supervisor(s) Name: *Wael H.Mansy*

Abstract:
Background: Recently, with advances in e-health, healthcare consumers require different skills to obtain,

interpret, and evaluate health-related information on the internet. Health literacy affects diabetes outcomes through lack of commitment to diet, and lack of knowledge regarding complication risks, hence influencing self-management ability.
Objective: To explore type 2 diabetes patients' experiences using the internet for diabetes management, and to investigate e-health literacy's effect on their glycemic control.
Methods: A cross-sectional, self-administered, voluntary, and anonymous questionnaire – using 5-point Likert, validated by eHEALS developed by Norman and Skinner – was distributed to 99 patients from primary healthcare and diabetes clinics in a large tertiary hospital, Riyadh. A linear regression model estimates the effect of demographic variables (age, gender, and education) on eHealth literacy, controlling for participants' perceived usefulness and importance of the internet.
Results: The median [IQR] age was 49 [47–51.5], BMI 32 [28–35], HbA1c 8.4 [6.65–9.6], and eHL score 28 [24–31.5]. About 64% of patients attained high (≥26) eHL scores (57% males, 42.8% females). Governmental workers showed significantly higher eHL scores than other employment categories (p=0.031), while surprisingly neither monthly income nor educational level did p=0.064 and 0.12 respectively. Median BMI was on the obese side; female participants had significantly higher BMI than males (p=0.002), with no significant differences in mean HbA1c and eHL scores.
Conclusions: Our sample's eHL scale was in the high range, irrespective of gender, education, or income. This study didn't identify correlation between eHL level and BMI or HbA1c as indicators of diabetic control.

Abstract Code: 060

Temporal association between antibiotic use and resistance in Gram-negative bacteria in a teaching university hospital

Student(s) Name: *Abdulrahman S. Aljuwaiser and Abdulrahman Alqadhibi*
Supervisor(s) Name: *Wael H. Mansy , Ali M. Somily and Bandar Balkhi*

Abstract:
Background: Antimicrobials are one of the most frequently misused therapeutic drugs worldwide. Gram-negative pathogens are responsible for nosocomial infections that make patients more susceptible to bacterial resistance. Rapid emergence of drug resistant by Gram-negative bacteria, emphasized the need of strategic plan for combating by monitoring the trends of the antimicrobial consumption.
Objectives: analyze the temporal association between different antibiotic consumption and resistance against gram negative bacteria
Methods: The antibiotic utilization per quarter in a large teaching tertiary hospital are extracted. Aligned to this, microbial culture was derived from microbiology laboratory to evolve a quarterly estimate for the antimicrobial resistance.
Results: As we gathered pharmacy and microbiology lab data of last two years only. We found insignificant association between rate of antibiotic consumption and bacterial resistance, however 2019 showed highly significant rate of bacterial resistance than 2020 (P<0.001) while the latter year showed significant lower antibiotic consumption than the year before. Third generation cephalosporins were most antibiotics (43.85%) prescribed followed by BLBLIs (35.5%), fluoroquinolones (15.15%) and the least were carbapenems (5.75%). On the other hand, ESBL pathogens constituted not more than 5% of total isolates compared to MDR pathogens which composed less than 5% of total isolates.
Conclusions: Correlation between prescription of Antibiotics and Gram-negative bacterial resistance to several, but not all, key antimicrobial agents in Saudi Arabian hospital. Where gram-negative bacterial resistance and prescription of broad-spectrum antimicrobial agents is high, factors other than antimicrobial usage may be equally important in maintaining high resistance rates.

Abstract Code: 061

Burden of chronic diseases in Saudi Arabia: a systematic review

Student(s) Name: *Mohammed bin salamah and Ziyad Alrehaili*
Supervisor(s) Name: *Hamoud Almutairi*

Abstract:
Background: Globally, the prevalence of chronic disease has increased. Expenditure and resource consumption attributable to the treatment of chronic disease has had a significant impact on health care systems. Resource allocation based on reliable studies helps decision-makers to adopt appropriate interventions and minimize costs. In Saudi Arabia, the few studies examining the burden of chronic diseases are of questionable quality. A systemic review was conducted to investigate the amount and quality of such research.
Methods: A comprehensive literature review conducted using the PubMed database. Only studies that related to the quality of life and cost of the diseases were included. A created scale from 0 to 4

was used to assess the quality of studies. Studies scored above two were assigned as high quality.
Results: Of the 7136 studies retrieved, only 12 met the inclusion criteria. Of these, nine related to the quality of life of people with chronic diseases and three were concerned with the financial cost of these diseases. The majority of the studies (75 %) did not meet the predefined criteria and were considered lower quality.
Conclusions: Although the number of studies concerned with the burden of chronic diseases in Saudi Arabia has increased in recent years, they have lacked quality. Improved methodology and design are needed in future research to provide valid, reliable data on this topic.

Abstract Code: 062

COX-1/COX-2 inhibition activity of 1,3-isoindolediones

Student(s) Name: *Faisal K. Alsamaiel, Mohammed M. Alzamil*
Supervisor(s) Name: *Adel S. El-Azab, Ibrahim A. Al-Suwaidan, Alaa A.-M. Abdel-Aziz*

Abstract:
Background: Imide moiety is an integral part of the structures of various essential molecules such as granulatimide, isogranulatimide, and thalidomide. Moreover, 1,3- isoindolediones, such as phthalimide, possess structural features, which confer potential biological activity and pharmaceutical use, such as antitumor, anti-convulsing, anti-inflammatory , "hypoglycaemic, anti – hyperlipidemic , carbonic anhydrase inhibitors, and COX-2 inhibitors. Therefore, this study aims to synthesize a group of 1,3-isoindolediones and evaluate their COX-1/COX-2 inhibition activity. The substitution pattern at the core 1,3-isoindolediones was selected to confer different electronic environments that would affect the lipophilicity and hence the activity of the target molecules.
Methods: 1,3-Isoindolediones are prepared by refluxing an appropriate acid anhydride and appropriate amine derivatives in glacial acetic acid for a proper time. The crude samples are purified by recrystallization, and the target molecules were confirmed by spectroscopic analysis and melting points. The colorimetric COX-1/COX-2 inhibition assay (Cayman Chemical, Ann Arbour, MI) was used to measure the ability of the tested derivatives to inhibit COX-1/COX-2 isozymes under the manufacturer's instructions.
Results: Synthesis of six 1,3-isoindolediones, purification by efficient recrystallization, and apply the technique of melting point determination and yield calculations. The chemical structure of synthesized imides was determined by ^{1}HNMR and ^{13}CNMR spectroscopy. The colorimetric COX-1/COX-2 inhibition activity was performed. Some of the target compounds showed potent activity with high COX-2 selectivity.
Conclusions: 1,3-Isoindole Diones can be easily prepared and assigned on the basis of spectroscopic data analysis. The COX-1/COX-2 inhibition assay of the target molecules has been investigated.

Medicinal Chemistry and Natural product

Abstract Code: 063

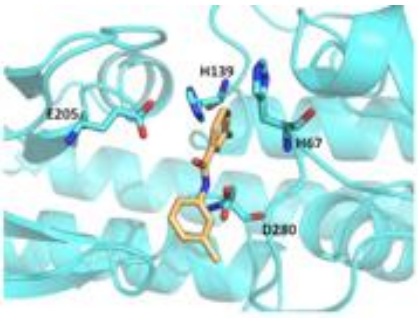
Using Molecular Modeling and Computational Chemistry to Discover Small Molecule Inhibitors Against *Streptococcus pneumoniae*

Student(s) Name: *Mohammed o. Alghamdi*
Supervisor(s) Name: *Ahmad J. Obaidullah*

Abstract:
Background: *Streptococcus pneumoniae* is a pathogenic bacterium that causes many serious infectious diseases such as bacterial pneumonia. Due to multidrug resistance in *S. pneumoniae* over the last few years, research has begun to identify new drug targets for pneumococcal disease therapy. Multiple research groups have identified a lipoprotein called pneumococcal surface adhesin A (PsaA) as an important pneumococcal virulence factor, and hence, as a potentially promising target for pneumococcal disease therapy. PsaA is a manganese transporter that is anchored to the bacterial cell membrane. We hypothesized that targeting this protein by small molecule inhibitors may offer a new avenue to an effective treatment for pneumococcal infections.
Methods: We have employed computer modeling to virtually screen small-molecule databases for inhibition of PsaA function. We targeted the metal binding pocket and performed structure-based virtual screening using UNITY of SYBYL. We performed molecular docking using GOLD. Biologically, we examined the ability of the hits to inhibit the bacterial growth by using a cell-based assay.
Results: More than 15 million compounds were screened from different databases based on pharmacophore template using UNITY. 1000 hits were identified and docked into the binding cavity using GOLD. The best hits were analyzed and tested. 5 compounds experimentally inhibited the growth of *S. pneumoniae* with MIC of 125-250 µM (Figure 1)
Conclusions: We concluded the screening with 5 compounds that will inhibit *S. pneumoniae* growth.

We will next experimentally test the compounds' effect on the purified protein (PsaA)

Figure 1: Binding mode of ZINC00241468 with MIC: 125 µM



Abstract Code: 064

Buddleja Polystachya Fresen.: An interesting medicinal plant with antioxidant and cytotoxic activities

Student(s) Name: *Bader Ali Althobaiti*
Supervisor(s) Name: *Ramzi Mothana*

Abstract:
Background: Plants have always been a basis for the traditional medicine systems and they have provided continuous remedies to the mankind for thousands of years. Medicinal herbs have been used in the treatment of different diseases in Arab countries including Saudi Arabia for centuries. Several natural products show potential role as antioxidant and anticancer agents. This study aimed to investigate the cytotoxic and antioxidant activities of one of the medicinal plants used in folk medicine namely *Buddleja Polystachya*.
Methods: The collected plant was dried, powdered and extracted with methanol by soxhlet extraction method. The MeOH-ex. was partitioned into hexane, chloroform and butanol extracts. Evaluation of the cytotoxic activity was done against three cancer cell lines namely A549 (lung), HepG2 (liver) and MCF-7 (breast) by using MTT assay. The antioxidant activity was determined using two different methods namely 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, and ABTS assays.
Results: The antioxidant activities tend to increase with increasing concentrations of all extracts. The results showed a higher DPPH and ABTS radical scavenging activity of $CHC1_3$-ext. (IC_{50}= 566.8 and 583.4 µg/ml respectively) compared to but.-ext (IC_{50}= 691.5 and 666.5 µg/ ml respectively) and hex ext. (IC_{50}= 698.5 and 687.3 µg/ ml respectively). Notable cancer cell growth inhibition was observed with the hexane ex. against HepG2 with IC_{50} of 16.5 µg/ml.
Conclusions: Our findings showed evidence that the extracts of *B. polystachya* possess interesting antioxidant and anticancer activities. Further work is needed for the isolation and identification of the active compounds in *B. polystachya.*

Experimental Therapeutics and Toxicology

Abstract Code: 065

The Reno-protective effect of Curcumin and Milk-thistle extract agent Voltaren/lipoglycans induced toxicity in Rat.

Student(s) Name: *Alanoud M. AlHindi, Haneen E. AlMalki*
Supervisor(s) Name: *Naglaa F. ElOrabi, Laila M. Fadda*

Abstract:
Background: Voltaren is non-steroidal anti-inflammatory drug which generally used for the treatment of various diseases. Lipoglycan well-characterized inducer of inflammation and widely present in the digestive tracts of humans and animals. Overdose of Voltaren can lead to renal injuries in both experimental animal and human. The aim of this study is to discover the protective effect of curcumin (CRN) or milk-thistle (MTHS) against renal injury induced by the combination of Voltaren (Voltn) and lipoglycans (LGS).
Methods: Twenty-four rats received CRN or MTHS for 7 days before Voltn/LGS and two other CRN or MTHS doses after Voltn/LGS.
Results: Voltn and LGS showed an increase in serum urea, creatinine, C-reactive protein (CRP), nitric oxide, uric acid, lipid peroxidation (MDA), TNF-α, IL- 6 and caspase-3 levels. Whereas glutathione (GSH) level, super oxide dismutase (SOD) activity, protein expression of podocin were decreased. More mRNA expression of cystatin-C, kidney injury molecule-1(KIM-1), protein expression of mammalian target of rapamycin (mTOR) and DNA damage-inducible transcript-3 (CHOP) were up regulated. The ingestion of the aforementioned antioxidants solely down regulated the dramatic increase of urea, creatinine, uric acid, CRP, caspase-3, NO, lipid peroxide, KIM-1, mTOR, cystatin-C and increased GSH level and SOD activity. The reno-protective properties of the antioxidants were also confirmed by histological findings.
Conclusions: CRN or MTHS have a powerful reno protective effect. It showed that it can restored oxidative stress imbalance and antagonize the

elevation in inflammatory markers induced by Voltn/LGS. Podocin mTOR CHOP were implicated in Voltn/LGS renal toxicity.

Abstract Code: 066

Combination of L- Ascorbic Acid and Curcumin is a Promising Candidate Against Plumbous Acetate Induced Brain Damage in Rats: Role of mTOR ,Chop,Beclin, CREB and BDNF expression

Student(s) Name: *Huda Abdullah Alsharafi , Amjad Fahad Alshammari*
Supervisor(s) Name: *Laila Mohammed Fadda, Ahlam Mohammed Alhusaini*

Abstract:
Background: Lead is a widespread ecological toxicant which can cause marked neurotoxicity. The chief site of action of lead is the central nervous system cause a decline in brain function. It's up regulates oxidative stress, potentiates apoptosis and alter synaptic transmission properties of neurons. Study aimed to evaluate the possible neuroprotective role of L- ascorbic (ASCR) and curcumin (CRCM) alone or together against plumbous acetate (PLAC)-induced neurotoxicity.
Methods: Thirty male rats were divided into five groups injected with PLAC then treated orally with ASCR and or CRCM alone or in combination for seven days.
Results: PLAC elevated brain TNF-α, interleukin-6, caspase-3 and malondialdehyde levels, while superoxide dismutase, glutathione as well as protein expression of brain-derived neurotrophic factor, cAMP response element-binding and Beclin1 were downregulated. Expression of DNA damage inducible transcript 3 and mTOR were up regulated in brain tissues matched with the control group. Histopathological examination supported the previous mentioned parameters, the administration of the antioxidants in question modulated all the altered previous parameters.
Conclusions: The combination regimen achieved the superlative results in the antagonizing PLAC induced neurotoxicity via its antioxidant and anti-apoptotic activities and it considered as promising therapy for other neurotoxic substance.

Abstract Code: 067

Sitagliptin mitigates diabetic nephropathy in a rat model of streptozotocin-induced type 2 diabetes: Possible role of PTP1B/JAK-STAT pathway

Student(s) Name: *Samaher I. Qaboli, Sarah M. AL-Qabbaa*
Supervisor(s):*NameNouf M. Al-Rasheed, Tahani K. Alshammari*

Abstract:
Background: Diabetic nephropathy (DN) is a microvascular complication of diabetes mellitus. Sitagliptin, a dipeptidyl peptidase inhibitor, improves DN through inflammation mitigation. Protein tyrosine phosphatase 1B (PTP1B) plays a critical role in regulating insulin, and the JAK-STAT signaling pathway results in the alleviation of inflammation. This study aimed to examine the therapeutic effects of sitagliptin in DN by modulating inflammation through PTP1B and the JAK-STAT signaling pathway in kidney tissue.
Methods: A total of twenty-four male Wistar albino rats were divided into four groups (6 rats/group). Diabetes was induced in 12 rats by a single intraperitoneal injection of streptozotocin (30mg kg^{-1}). The diabetic control received normal saline, and the diabetic treated group received sitagliptin (100mg kg^{-1}, p.o). The other groups were recognized as normal control and sitagliptin-treated normal control rats. Diabetic nephropathy and inflammatory biomarkers were examined. Molecularly, we assessed PTP1B, P-JAK2 and P-STAT3 in kidney tissues via Western blot. We further examined kidney sections using histology. Ethics reference no: KSU-SE-20-15.
Results: Administration of sitagliptin significantly reduced DN biomarkers (serum creatinine $P<0.05$; BUN $P<0.001$; and urea level $P<0.001$), and inflammatory biomarkers (IL-6 and TNF-α levels $P<0.001$) compared to the diabetic control group. Sitagliptin reduced the expression of PTP1B (1.34 vs. 5.8 folds), p-JAK2 (2.2 vs. 8.4 folds), and p-STAT3 (1.09 vs. 2.4 folds) ($P<0.001$) and modified the histological changes.
Conclusions: Data suggest that sitagliptin attenuated DN via the modulation of PTP1B and JAK/STAT signalling pathway, indicating its potential for DN management.

Abstract Code: 068

Adrenoceptor pathway as a potential therapeutic target for triple negative breast cancer

Student(s) Name: *Bedriyh S. Alnfaie, Fai A. Alzuhayri*
Supervisor(s) Name: *Layla A. Alkharashi, Qamraa H. Al-Qahtani*

Abstract:
Background: Breast cancer ranked the first place of the most common cancers among Saudi female. Triple negative breast cancer is an aggressive and difficult to treat class of breast cancer that shows negative

expression of estrogen/progesterone receptors and HER-2 protein. Recently, several studies indicate that adrenoceptors play a role in carcinogenesis. Thus, this study was designed to understand the role of adrenoceptor in the epithelial-mesenchymal transition and investigate the role of adrenoceptor blockade in regulating cellular EMT signaling pathway of TNBC.
Methods: The study was conducted using MDA-MB-231 cell lines that were treated with either control vehicle or four different drugs; adrenaline, noradrenaline, propranolol and phentolamine. After treatment with a submaximal dose of each drug, the cells were subjected to immunoblotting analysis to investigate the differences in the expression level of several EMT markers. Concomitantly, the cells migration, invasion and proliferation capacity were also studied in different treatment groups using real-time cell analyzer.
Results: Treatment with adrenaline and noradrenaline induced the level of the mesenchymal markers N-cadherin and Twist-1, while they reduced the epithelial marker E-cadherin, as compared to the control. Also, cell migration, invasion and proliferation capacity were significantly increased with adrenaline treatment. However, treatment with nonselective α and β blockers resulted in significant reduction in both EMT markers and cellular migration, invasion and proliferation.
Conclusions: The resulting data provide clear evidence that adrenoceptors play a major role in the EMT pathway and could serve as adjunct therapeutic option in TNBC.

Abstract Code: 069

Serum Proteomic and Ionomic Profiling of Saudi Patients with Amphetamine and/or Cannabis Use Disorder.

Student(s) Name: *Wedad H. Alotaibi; Majed M. Alhamdan*
Supervisor(s) Name: *Fawaz F. Alasmari*

Abstract:

Background: Amphetamine and cannabis addiction is common in numerous countries, including Saudi Arabia. Reducing the progression of amphetamine and cannabis dependence could provide beneficial consequences clinically and economically. Studies found positive correlation between neuropsychiatric diseases and dysregulated blood proteins/ions levels in humans. Schizophrenia is associated with altered proteomic pathways of inflammation and immunological responses. However, little is known about the effects of cannabis and/or amphetamine on the levels of essential ions and proteins in the blood.
Methods: Four groups, control, amphetamine, cannabis and amphetamine-cannabis, were involved in the study. Blood samples were obtained from the participants. Complete blood count (CBC) and lipid profile were determined. Kidney functions, serum ions, total protein and carbon dioxide (CO2) were performed using EISA-based technology. Proteomic profiling of cannabis use disorder (CUD) patients was determined.
Results: The statistical analysis revealed that the average lipid parameters, CBC and kidney functions are within normal values and no significant changes between these four groups. We found that cannabis and/or amphetamine increased the serum level of CO2. Moreover, total protein level was reduced in amphetamine group as compared to healthy control. Additionally, phosphate, sodium and chloride serum levels were modulated in cannabis exposed groups. Proteomic assay showed that proteins regulate inflammation, immunological reactions and neurological diseases were altered in CUD patients.
Conclusions: Our work suggests that chronic exposure to cannabis and amphetamine induced dysregulation on the serum ions, total protein and CO2 without affecting kidney functions. In addition, CUD patients showed altered serum proteins expression using proteomic assay.

Abstract Code: 070

MiR-145-3p: A Novel Small Therapeutic Molecule to Target Breast Carcinogenesis and Chemotherapy Resistance

Student(s) Name: *Razan S. Alshahrani, Munirah A. Alkathiri*
Supervisor(s) Name: *Homood As Sobeai*

Abstract:

Background: Dysregulations of microRNAs have been shown to play a critical role in breast cancer. Although the biological function of leading strand is well-known, recent data have been shown that passenger strand may also contribute to the activity. Therefore, our study aimed to investigate the role of the passenger strand of MIR145, miR-145-3p, in breast carcinogenesis in two breast cancer cell lines, MCF7 and MDA-MB-231.
Methods: We examined the expression of MIR145 in breast cancer patients compared to healthy individuals and the impact on survival in TCGA and METABRIC databases, respectively. We evaluated the anticancer activity of a range of doses (3 to 100 nM) of miR-145-3p upon 24- and 48-hour treatments using the MTT assay. The influence of the miR-145-3p on apoptosis and cell cycle was investigated utilizing flow cytometry. Finally, we screened for downstream

targeted pathways utilizing a transcriptome study done in MCF7.
Results: MIR145 was significantly downregulated in breast cancer patients compared to non-diseased individuals (P<0.001) which led to a negative impact on patient survivals (HR= 0.81 [0.67-1], P= 0.047). 10 nM of miR-145-3p significantly reduced cell viability compared to dose-matched controls in both cell lines after 48 hours of treatment (P< 0.05). MiR-145-3p treatment induced apoptosis and accumulated cancer cells at G1 phase in both cell lines. Finally, the transcriptome analysis revealed that the 324 significantly under-expressed genes enriched in pathways associated with carcinogenesis.
Conclusion: Our results suggest that miR-145-3p has a significant molecular role in breast tumorigenesis, proposing a novel strategy to treat breast cancer.

Abstract Code: 071

Development of Tacrolimus-loaded polymeric nanoparticles to overcome related toxicities

Student(s) Name: *Norah A. AlNaim*
Supervisor(s) Name: *Norah A. Albekairi, Aliyah A. Almomen, hessa E. Alduhailan*

Abstract:
Background: Drug-induced nephrotoxicity is the major dose-limiting side effect of many medication including tacrolimus(TAC) and it has also been associated with moderate to sever neurological side effects. Currently, nanobiology is a rapidly advancing discipline that has multiple applications starting from basic science to biotechnology, medicine, and pharmaceutical research. Better safety was reported in terms of nephrotoxicity associated with tacrolimus nanoparticles (TAC-NPs) as compared to conventional tacrolimus, our aims are to formulate TAC-NPs and optimize their physicochemical properties and to evaluate their cytotoxicity in an in-vitro models.
Method: TAC-NPs were prepared in different drug loading (5, 10 and 20%) by dissolving TAC and PLGA in acetone using a modified solvent displacement method. Mean particle size, polydispersity index and zeta potential of PLGA-TAC nanoparticles were measured by dynamic light scattering. The encapsulation efficiency of the PLGA-TAC nanoparticles was determined by indirect method and the morphology of PLGA-TAC nanoparticles determined using scanning electron microscope (SEM). Cytotoxicity using kidney, neuronal and cancerous cells (A549, Hek293T, ANGM-CSS, SH5Y5Y) was conducted to measure TAC-NPs effect on cells proliferation and it was measured by MTT Metabolic activity assay.
Results: TAC-NPs were characterized for particle size which ranged 121 - 254.8nm and have a PDI range 0.112 - 0.241 and a zeta potential between -26.2 and -29.8 mV. Cytotoxicity test revealed that TAC-NPs (10,20%) showed insignificant difference compared to the controlled. However, the 5% concentration showed a significant increase in cell proliferation.
Conclusion: TAC-NPs showed good drug loading and acceptable characteristics. Further cytotoxicity studies are under ongoing.

Abstract Code: 072

Studying the impact of small tyrosine kinase inhibitors on the induction of cardiovascular remodeling using vascular smooth muscle cells

Student(s) Name: *Abdulaziz A. Alsalem, Abdullah A. Almangour*
Supervisor(s) Name: *Khalid A. Alhazzani*

Abstract:
Background: Small tyrosine kinase inhibitors (TKIs) have revolutionized the treatment of cancer. Among these agents, we studied the Dasatinib, Nilotinib and Sorafenib. Unfortunately, cases of cardiotoxicity were reported in human and the effect of these agents on vascular smooth muscle cells (VSMCs) still controversial. Therefore, this study aimed to investigate the effects of TKIs on vascular smooth muscle proliferation, migration and delineate the underlying mechanisms on inflammation biomarkers.
Methods: VSMCs were isolated from albino rats and were grown in DMEM-F12 media. Cells were divided to four groups as follows: Control, Dasatinib, Sorafenib and Nilotinib. MTT assay was deployed to assess cell cytotoxicity. Scratch assay was also used to assess the ability of TKIs to inhibit cell migration. Evaluation of apoptosis was performed using flow cytometry with Annexin V/PI to detect the early apoptotic cells. RNA was isolated using Trizol Reagent. Gene expression was detected using Real-Time PCR expression.
Results: All TKIs agents showed a significant cytotoxicity towards VSMCs at low doses (<1000nM, P<0.05) as well as a significant inhibitory effect on the migration process (P<0.05) compared to control group. Gene expression analysis revealed a significant up-regulation of inflammatory biomarkers (TNF-α,IL-6,IL-1ß) besides up-regulation of apoptotic pathways (P53,BAX) whereas down-regulation of (BCL-2).
Conclusions: The ability of TKIs to halt VSMCs proliferation and migration may give an evidence of their propensity to induce vascular injury and remodeling. Our results also suggested that inflammation might play a central role in the toxicity

of Nilotinib which further research is warranted to confirm these findings.

Abstract Code: 073

miR-145-3p: A Novel Small Therapeutic Molecule to Target Colon Carcinogenesis and Chemotherapy Resistance

Student(s) Name: *Ali Alqasem and Basil Alamri*
Supervisor(s) Name: *Homood As Sobeai*

Abstract:

Background: MicroRNAs play an important role in carcinogenesis and chemotherapy efficiency in colon cancer. MicroRNA function is attributed to the leading strand. However, emerging reports showed that the passenger strand is biologically functional. Therefore, our study aimed to investigate the role of the passenger strand of MIR145, miRNA-145-3p, in colon carcinogenesis and chemo-sensitivity in the colon cancer cell line, HCT-116.

Methods: We examined the expression of MIR145 in colon cancer patients compared to healthy individuals using The Cancer Genome Atlas database. Tumor suppressing and chemotherapy (cisplatin and 5-fluorouracil) sensitizing activities of miR-145-3p have been evaluated utilizing the MTT cell viability assay after 24 and 48 hours upon treatment. Finally, we investigated the apoptotic effect of miRNA-145-3p on HCT-116 cells using Annexin V assay.

Results: MIR145 was significantly down expressed in colon cancer patients compared to non-diseased individuals ($P = 0.009$). Four doses (3,10,30,100 nM) of miR-145-3p significantly reduced cell viability of HCT-116 after 48 hours of treatment compared to dose-matched controls ($P< 0.05$). 10 nM of miR-145-3p was significantly able to sensitize colon cancer cells to four doses (0.3, 3, 30, 300 nM) of 5-FU and two doses (3 and 300 nM) of cisplatin compared to dose-matched controls ($P< 0.05$). MiR-145-3p treatment induced early apoptosis by two-fold compared to the matched control.

Conclusions: Our results suggest that miR-145-3p has a significant role in colon malignancy and chemotherapy resistance, supporting the idea of using the microRNA as a novel therapeutic agent to tackle tumor aggressiveness and subsequently improve treatment outcomes.

Abstract Code: 074

Study of Nephroprotective Activity of N-Acetyl Cysteine and Chlorogenic Acid and their Impact on Inflammatory Pathways

Student(s) Name: *Rawd M. Alsubaie, Amal M. bin Dhahi*
Supervisor(s) Name: *Amira Badr & Yasmen F. Mahran*

Abstract:

Background: Cisplatin (CDDP) is an antineoplastic agent, with a dose-limiting nephrotoxicity. Cisplatin-induced nephrotoxicity is a complex situation where interplay of oxidative stress, inflammation, and apoptosis is correlated. Toll-4 receptors (TLR4) and Inflammasomes are pattern recognition receptors that are responsible for the activation of inflammatory responses. Recently, they were assigned to play a significant role in acute kidney injury. N-acetylcysteine (NAC) and chlorogenic acid (CGA) have documented nephroprotective activity via suppressing oxidative and inflammatory pathways. Therefore, the present study aimed to investigate the contribution of the upregulation of TLR4 and inflammasome signaling pathway to CDDP-induced nephrotoxicity and their modulation by NAC or CGA.

Methods: Wistar rats were divided into 5 groups. Control group; CDDP group: was given a single injection of CDDP (7 mg/kg I.P.); CDDP+NAC or CGA groups received either NAC (250 mg/kg P.O.) or CGA (20 mg/kg P.O.); Combined group received CGA (20 mg/kg P.O.) and NAC (250 mg/kg P.O.) one week before and after CDDP injection. Serum and kidney samples were assessed using histopathology, spectrophotometry, ELISA, and Western Blot.

Results: Cisplatin-induced acute nephrotoxicity was evident by increased blood urea nitrogen (BUN) and serum creatinine. Nephrotoxicity was associated with histopathological insults, increased lipid peroxidation, reduced antioxidants, and elevated inflammatory markers (NF-κb and TNF-α). CDDP also activated TLR4/inflammasome (NLPR3)/IL-1β signaling pathway, with increased Bax/BCL-2 ratio (apoptotic marker). Both NAC and/or CGA significantly corrected these changes.

Conclusions: This study emphasis the contribution of TLR4/NLPR3/IL-1β signaling in CDDP-induced nephrotoxicity and is the first to report its inhibition as part of nephroprotective activity of NAC or CGA.

Abstract Code: 075

The protective role of thiamine and pentoxifylline in rhabdomyolysis-induced acute kidney injury

Student(s) Name: *Aljazzy K.Alsaffi , Toka M.Ghafir Almasri*
Supervisor(s) Name: *Hala A.Attia*

Abstract:

Background: Acute kidney injury (AKI) is a common complication of rhabdomyolysis (RM), a syndrome characterized by breakdown of skeletal muscle with

the release of myoglobin that is accumulated in renal tubules resulting in oxidative stress, inflammation and apoptosis. Pyroptosis is a unique programmed cell death mediated by the activation of caspase-1 which activates gasdermin D (GSDMD), a pore-forming protein, leading to cell death. This study aims to explore the pathogenic role of pyroptosis in RM-induced AKI and to evaluate the renoprotective effects of two antioxidants; pentoxifylline (PTX) and thiamine (TM).

Methods: RM-AKI was induced in rats by intramuscular injection of glycerol (10 ml/kg). PTX (100 mg/kg, oral); TM (25 mg/kg, i.p) and PTX+TM, were pre-administered for 12 days and 3 days following glycerol. Serum creatinine, blood urea nitrogen (BUN), creatine kinase (CK, marker of muscle damage), oxidative stress, inflammatory markers, Bcl-2 (anti-apoptotic), BAX (apoptotic marker) and the levels of activated caspase-1, interleukin-1β and GSDMD were estimated. Histological examination and immunohistochemistry of c-myc (apoptotic marker) were performed.

Results: Compared to AKI model, co-administered drugs revealed a significant reduction in creatinine, BUN, CK, lipid peroxidation, inflammatory markers, BAX, while Bcl-2 was increased. The accumulation of protein casts in renal tubules and the positive immunostaining of c-myc were reduced. Cleaved caspase-1, interleukin-1β and GSDMD were significantly elevated in RM-AKI model, and this elevation was ameliorated by tested drugs.

Conclusions: Our findings demonstrate the involvement of pyroptosis in RM-AKI. PTX and TM may be a potential renoprotective approach for patients with RM.

Abstract Code: 076

Role of G protein-coupled receptor kinase 5 in animal model of cardiac hypertrophy

Student(s) Name: *Sara I. Alhaidar*
Supervisor(s) Name: *Asma S. Alonazi, and Anfal F. Bin Dayel*

Abstract:

Background: G protein couple receptor kinase 2 and 5 (GRK2 and GRK5) are the main negative regulator for β-adrenoceptor activation, which play an important role in cardiac function and contractility. Up-regulation in GRK2 levels has been found play an important role in cardiac hypertrophy development. However, little is known about whether GRK5 modulates isoprenaline induced cardiac hypertrophy and the change in protein level of GRK5 in animal model of cardiac hypertrophy is not well elucidated yet.

Aim: This research aims to investigate the change in GRK5 protein expression in isoprenaline-induced cardiac hypertrophy animal model.

Method: Cardiac hypertrophy was induced in rats by daily Intraperitoneal injection of Isoproterenol (5mg/kg/day). After three weeks, cardiac hypertrophy biomarkers were assessed. GRK5 protein expression were detected using western blotting and immunohistochemistry techniques. Ethics reference number for this study is KSU-SE-20-25.

Results: Key findings data showed that serum creatinine, troponin T and heart weight/ body weight ratio significantly increased in cardiac hypertrophic rats. Furthermore, a significant up-regulation in GRK5 protein expression was observed in hypertrophic myocardium tissue.

Conclusion: Our research yielded promising results verifying a strong link between animal model cardiac hypertrophy and an over expression of GRK5. Our results suggest that over-expression of GRK5 in animal model of cardiac hypertrophy might be harmful to the heart and play an important role in pathological cardiac hypertrophy development. Furthermore, over-expressed GRK5 could be suggested as new marker to investigate cardiac hypertrophy development or as potential therapeutics target.

Abstract Code: 077

Role of dasatinib in RAW cells-ZnO nanoparticles interaction

Student(s) Name: *Faisal S.ALhufayian, Moayad O.Almuzayil*
Supervisor(s) Name: *Abdullah A. Aldossari*

Abstract:

Background: Nanotechnology has developed rapidly and involved in daily life applications. Zinc oxide (ZnO) nanoparticles (NPs) are used in different applications such as dental materials. The extensive biological uses of zinc oxide nanoparticles have led to serious concerns about their side effects. It has been reported that the use of ZnO NPs resulted in toxic effects on different organs and systems such as liver and immune system. Different types of mechanisms and pathways can be involved in ZnO toxicity such as oxidative stress. Dasatinib is small molecule-inhibitor of Src-family protein tyrosine kinases. Dasatinib binds to and inhibits the growth-promoting activities of these kinases. Oxidative stress can activate Src kinase which triggers cell signaling cascade that may lead to cell death. Our aim is to evaluate the role of dasatinib in cell death resulted from exposure to ZnO nanoparticles

Methods: Cell line culturing: RAW cells will be cultured in DMEM medium supplemented with 10% fetal bovine serum (FBS) and 1% Antibiotic-Antimycotic solution. Cells maintained in an incubator containing 5% CO2 at 37 ◦C. Cell's proliferation will be detected using MTT kit.
Results: Our results show that pretreatment with dasatinib increase susceptibility to the risk of ZnO nanoparticles toxic effect
Conclusions: ZnO nanoparticles toxicity is more likely to occur in individuals using dasatinib or other protein tyrosine kinases inhibitors

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Abstract Code: 078

Adverse Immune Response of Engineered Nanomaterials in a Macrophage Model

Student(s) Name: *Mohammed Zain Alnakhli*
Supervisor(s) Name: *Nasser Bader Alsaleh*

Abstract:
Background: Engineered nanomaterials (ENMs) are precisely synthesized materials within the size range of 1 – 100 nm for specific applications including nanomedicine. The use of ENMs is exponentially growing, however, adverse responses of ENMs to humans and the environment is still largely lacking. Previous studies have demonstrated potential toxicity of metal ENMs on the immune system. Here, we sought to understand the potential adverse responses of ZnO and NiO on macrophages, a key cell type involved in fighting and eliminating pathogens and foreign bodies.
Methods: We utilized a mouse macrophage cell model (Raw 264.7). Cell viability was assessed by employing the MTT assay. Generation of reactive oxygen species (ROS) was measured using a fluorescent probe (H2DCFDA).
Results: Our results demonstrated that exposure to both zinc oxide (ZnO) and nickel oxide (NiO) nanoparticles reduced cell viability in a concentration-dependent manner. Exposure to ZnO (but not NiO) nanoparticles appeared to be associated with ROS generation particularly at lower concentrations. Our studies have also assessed whether exposure to subtoxic concentrations of metal ENMs may render cells more susceptible to toxic co-exposures. Our results showed that co-exposure to doxorubicin and ZnO or NiO nanoparticles at subtoxic concentrations was not associated with exacerbated toxicity.
Conclusions: Together, our findings suggest that exposure to metal ENMs is associated with direct cellular toxicity, a response that may be driven by generation of ROS in the case of ZnO nanoparticles. Although our results did not show increased toxicity with co-exposure to doxorubicin, adverse responses at the functional level need to be investigated.

Pharmaceutical Engineering and Drug Regulation

Abstract Code: 079

Development of Inhalable Nano-Liposomal Dry Powder Luteolin for Targeted Lung Cancer Therapy

Student(s) Name: *Shouq A. Al-Khtani and Maram R. Al-Dawsari*
Supervisor(s) Name: *Alanood S. Al-Murshedi and Basmah Aldosari*

Abstract:
Background: Traditional treatments of lung cancer have many limitations. To overcome these limitations, nanomedicine for local pulmonary drug delivery were developed to target cancerous cells and limit toxicity on healthy cells. The application of natural products to treat various diseases, such as cancer, has been an important area of research. Luteolin (Lut) is a flavonoids compound that is found in plants and possesses a chemopreventive activity. However, their poor aqueous solubility restricts its clinical application. Therefore, Luteolin nano liposomes (Lut-NLs) powders for dry powder inhalation (DPI) delivery, formulated with phospholipids similar to endogenous lung surfactant, offer unique opportunities in pulmonary nanomedicine with controlled release and enhanced stability. This research was conducted to develop dry powders of NLs containing Lut using spray drying technique to treat non-small cell lung carcinoma.
Methods: Lut-NL were prepared using thin film hydration method. The liposomes were optimized according to their particle size, polydispersity, zeta potential and encapsulation efficiency. In vitro cytotoxicity of Lut-NL was determined using H-1975 cells. Lastly, dry powder formulation was obtained from the optimized liposomes after spray drying with Chitosan and characterized in terms of size, morphology and %yield.
Results: Lut-NLs have spherical shape, particle size of 62.79 nm, polydispersity index of 0.092, zeta potential of -24.18 mV, and efficiently encapsulated by 90%. Lut-NLs showed dose-dependent decrease in the viability of cells with IC50 values of 55.87 µmol·L. DPI show good yield and solid-state characteristics

Conclusions: Inhalable formulation of Lut-NLs provides a promising treatment strategy in non-small cell lung cancer.

Abstract Code: 080

A comparative evaluation of different brands of mometasone furoate cream available in Saudi Arabian market

Student(s) Name: *Waleed A. Khayat*
Supervisor(s) Name: *Fahad I. Al-Jenoobi, Abdul Ahad*

Abstract:

Background: The objective of the study was to evaluate six generic products of mometasone furoate cream (0.1%), which are available in the Saudi Arabian market in comparison with the innovator product. The products were evaluated for pH, spreadability, and drug content.

Methods: The pH of the cream was directly measured with a digital pH meter. For spreadability testing (%), 0.5 g cream was placed within a circle of 2 cm diameter on a glass plate. A weight of 500 g was rested on an upper glass plate for 5 min and the increase in the diameter was recorded. For drug content, an amount (1 g) of each cream was transferred to a 100 mL volumetric flask and Methanol was added to to extract the drug. The samples were submitted to ultrasound for 45 min, their volume was completed with methanol. All samples were filtered through a 0.45 µm membrane prior HPLC analysis.

Results: The mometasone furoate cream products coded as A, B, C, D, E, F, and G showed pH of 5.83 ± 0.12, 5.77 ± 0.03, 5.66 ± 0.21, 6.42 ± 0.19, 6.26 ± 0.04, 6.87 ± 0.07, 5.33 ± 0.15 respectively. A, B, C, D, E, F, and G showed 166.67 ± 14.43 %, 326.67 ±7 .64 %, 253.33 ± 2.89 %, 298.33 ± 7.64 %, 295.00 ± 5.00 %, 388.33 ± 12.58 %, 313.33 ± 2.89 % spreadability; respectively. Products A, B, C, D, E, F, and G presented 97.87 ± 3.18 %, 97.00 ± 8.09 %, 95.86 ± 2.06 % , 97.45 ± 0.41 %, 104.63 ± 1.21%, 102.91 ± 1.35 %, 99.70 ± 0.47 % drug content; respectively.

Conclusions: Based on the results, in comparison with the reference product, all the tested products are assumed to be chemically and pharmaceutically equivalent and therefore, could be considered as substitutes for the brand

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Others

Abstract Code: 081

The Prevalence of Contraindications to Combined Oral Contraceptives Among Reproductive-aged Women in Obstetrics and Gynecology Clinic, Riyadh, Saudi Arabia: A Single-Center Cross-sectional Study

Student(s) Name: *Walaa M. Almatri and Manal F. Alshyhani*
Supervisor(s) Name: *Ghada A. Assiri and Mansour A. Mahmoud.*

Abstract:

Background: Combined-Oral-Contraceptives (COCs) are hormonal therapy that contain both estrogen-progestin. Despite the benefits of COCs, the safety profile should be carefully considered. There're no sufficient studies in KSA regarding the prevalence of its contraindications (CIs), although those CIs are considered a serious health problem based on category 3-4 of WHO medical eligibility criteria for contraceptive use. Our objectives are to determine the prevalence of CIs among women who're taking COC, and to assess risk factors associated with its use.

Method: A cross-sectional study includes a reproductive-aged woman (18-49 years) with or without known CIs were recruited from KKUH OB-GYN clinic in Riyadh, KSA. Data were collected from E-medical records and a standardized, pretested, structured questionnaire conducted via phone-call.

Results: A total sample of 242 records were collected. One-hundred-thirteen were collected via phone-call and E-records and 129 via E-records only. Majority of the participants had bachelor degree (65.7%) and were married (61.6%) and predominantly adherent to their pills (98.7%). 39% of the participants were currently using their COC. The Overall prevalence of CIs to COCs was 30%. The most common CIs observed were hypertension (12.4%), migraine (8.7%), diabetes (7.5%), and breast-feeding (7%). Women more than 35 years-old have 0.496 risk of developing CIs [OR=0.496, (95% Confidence-Interval: 0.283 to 0.871), P-value 0.015]. Non-significant risk was associated with education level.

Conclusion: The prevalence of CIs to COCs was common. Encouraging the importance of proper assessment prior to prescribing, and considering alternatives suitable for long-term administration among women taking the oral-contraceptive regularly is recommended.

Abstract Code: 082

Examining Stress of Virtual Learning in Colleges of Health Sciences: A Cross-Sectional Study in the Era of COVID-19 Pandemic in Saudi Arabia

Student(s) Name: *Sarah S. Alseraye, Rawabi F. Alqasim*
Supervisor(s) Name: *Tahani K. Alshammari*

Abstract:
Background: Stress and anxiety are relatively common, especially in females and college students. Stress can impact student's overall performance. The COVID-19 pandemic is associated with high levels of psychological distress and affected education worldwide, which was shifted from on-site to virtual learning. This study aimed to evaluate stress toward virtual learning among colleges of health science students after six months of COVID-19 out-break. And to assess anxiety prevalence.
Methodology: Participants were recruited by convenient sampling and snowball strategies. Our study was conducted between November 18th December 6th, 2020. The questionnaires included the General Anxiety Disorder-7 (GAD-7) scale, and their attitude toward virtual learning. The study was validated by a pilot study, followed by implementing some amendments.
Results: A total of 418 colleges of health science students, ranged in age between 18 and 27 years old ($M = 20.88$, $SD = 1.97$), participated in the study. Our analysis indicated that around 80% of the participants exhibited anxiety (mild = 27.51%, moderate = 28.21%, and severe = 23.21%). Anxiety was recognized more frequently in women (72.09%) than in men (27.91%). Interestingly, our study showed that students from the college of applied science and nursing exhibited more stress of virtual learning than students from the college of medicine, dentistry, and pharmacy.
Conclusion: This study is significant in two main aspects. Firstly, we assessed the stress of virtual learning. Secondly, we characterize anxiety in students of health sciences' college and highlight the need to establish supportive programs, in particular among women.

Abstract Code: 083

Prevalence and Contributing Factors of Medication Errors in Adult Inpatient: a Systematic Review

Student(s) Name: *Ghada A. Aldrees and Atheer T. Alotaibi*
Supervisor(s) Name: *Tariq M. Alhawassi*

Abstract:
Background: Globally, Medication errors are patient safety concerns that have the potential to cause serious consequences to patients. Therefore, the objective of this study is to review the published literature to assess the prevalence of medication errors and contributing factors for the development of medication errors in hospitalized adults in Saudi Arabia.
Methods: Four electronic databases were searched, including MEDLINE, Embase, IPA, and CINAHL. Moreover, a manual search using Google Scholar to identify studies published in English between January 2000 and November 2020 was conducted. Studies were screened independently by two reviewers. Then, data extracted and recorded into a standardized Excel which included study characteristics, MEs-related information, and major findings. Quality assessments (using STROBE checklists) were conducted.
Results: Two studies met the inclusion criteria, the first study was done in Riyadh among all hospital settings including ICU, at King Abdulaziz Medical City. This study included a total of 31,399 patients, the prevalence of MEs was 1.2%. The second study was done in Alkobar at King Fahad University Hospital. Out of 23957 admissions, MEs were seen in 38 patients. After extracting the adult data 24 patients were adults which represent 63.1% of patients who experienced MEs. Therefore, the prevalence of MEs among adults was 0.09%. The number of studies was insufficient to represent the prevalence of MEs among adult inpatients in SA.
Conclusion: We believe that the prevalence of medication errors in SA is high. However, under-reporting of MEs is one of the causes that lead to underestimation of the actual number in SA

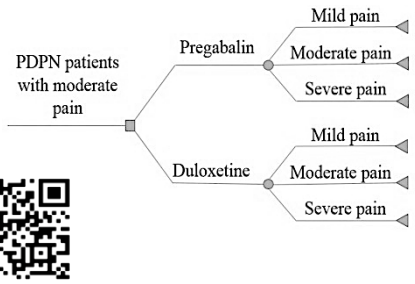
Abstract Code: 084

Cost effectiveness of Pregabalin versus Duloxetine for people with painful diabetic neuropathy in Saudi Arabia: Decision tree analysis

Student(s) Name: *Rana O. Alghunaim, Shahad M. Alosaimi*
Supervisor(s) Name: *Saja H. Almazrou*

Abstract:
Background: Painful diabetic peripheral neuropathy (PDPN) imposes a significant economic burden in direct medical costs and indirect costs. Pregabalin is the most studied and most used agent for treatment of PDPN. However, several economic evaluations in different countries showed that Duloxetine is cost-effective agent. The aim of this study is to evaluate the cost effectiveness of Pregabalin versus Duloxetine for people with PDPN in Saudi Arabia.

Methods: Decision tree model was used to evaluate cost effectiveness from Ministry of Health perspective in Saudi Arabia with a time horizon of 12 weeks. Hypothetical cohort of PDPN patients with moderate pain treated with Pregabalin or Duloxetine were included. Quality Adjusted life Year (QALY) is considered the effectiveness outcomes. Healthcare resource use, probabilities of good pain relief and utilities were obtained from published literature and expert panel. Unit costs of healthcare resource use and medications were obtained from Ministry of Health and Saudi Food and Drug Authority (SFDA). All costs expressed in Saudi Riyals (SR). All analysis were performed using TreeAge Pro software.
Results: Pregabalin was more costly, more effective and provides savings. Total Cost of Pregabalin and Duloxetine were SR475.6021 and SR455.5509 respectively. Effectiveness was 0.5661 for Pregabalin and 0.5084 for Duloxetine. Incremental Cost effectiveness ratio (ICER) was 347.51. Total savings with Pregabalin were SR14981.95. The model was most sensitive to the change of cost in patients with mild pain treated with Pregabalin.
Conclusions: This study suggests that Pregabalin is cost effective compared with Duloxetine for treatment of PDPN in Saudi Arabia.



Abstract Code: 085

Economic Burden of Hypertension in Saudi Arabia: A single center cost of illness analysis

Student(s) Name: *Abdulmajeed Alzahrani, Nasser Alomran*
Supervisor(s) Name: *Ahmed Alghamdi*

Abstract:
Background: Hypertension (HTN) is a chronic disease associated with considerable global economic burden. The aim of this study was to estimate the economic burden of hypertension and its predictive factors in Saudi Arabia from healthcare provider perspective.
Methods: This was a retrospective prevalence-based single-center cost of illness study conducted at KSUMC outpatient clinics. Patients' medical records were reviewed for the year 2019. A bottom to up micro-costing approach was conducted to estimate the direct medical costs including (medications, lab and diagnostics, hospitalization, images, visits, and emergency,). Descriptive and inferential statistics was performed.
Results: A total of 202 HTN patient were included in the study with mean age of 69 years and 62 % were females. The median annual cost per patient was SAR 6,896. The cost increased to SAR 12,812 in patient who were hospitalized due to HTN complications. The median annual cost varied by gender (SAR 7,086, SAR 6,582) for female and male patients respectively. In addition, the cost was significantly increased in the presence of other comorbidities including ischemic heart disease, diabetes, and dyslipidemia (SAR 9,277, SAR 8,583, SAR 7,547) respectively. The major driver of HTN cost was the cost of medications followed by lab test, diagnostic tests, and emergency room visits (33%, 22%, 17%, 16%) respectively.
Conclusions: Hypertension exerts substantial economic burden in Saudi Arabia. Health decision makers may consider allocating resources toward preventive programs and better cost-effective treatment approaches to improve the economic value for the healthcare system.

Abstract Code: 086

Development of smart nanocarriers for cancer targeting therapy

Student(s) Name: *Mohammed N. Alotaibi, and Meshal M. Alzahrani*
Supervisor(s) Name: *Gamaleldin I. Harisa, Mohammed M. Badran*

Abstract:
Background: Lung cancer is one of the leading causes of death worldwide. Gefitinib (GFT) is used for the treatment of lung cancer, however, it is non-selective, and exhibited a deleterious effect on normal cells. This study aimed to fabricate lipid nanoparticles (SLNs), and nanostructured lipid carriers (NLC) to achieve selective deposition of GFT into tumor cells. The prepared nanocarriers were decorated with chitosan and squalene to enhance GFT targeting into the cancer cell. The cytotoxicity was studied using the A549 cell line as a surrogate model for lung cancer.
Methods: SLNs and NLCs were prepared using the nanoprecipitation method. Subsequently, the prepared nanocarriers were decorated with chitosan and squalene. The nanocarriers were characterized in terms of particle size (PS), zeta potential (ZP), GFT entrapment efficiency (EE%), stability, and GFT releasing profile. In vitro cytotoxicity was investigated using MTT assay. Malvern particle size analyzer and spectrophotometer were used in the analysis.

Results: The present results revealed that the prepared SLN and NCLs exhibited nanosize (725 nm), negative ZP(-19mV), and PDI (0.500). The chitosan decoration changes the ZP of the nanocarriers into positive (11mV). EE% of GFT into SLN and NCLs is in a desirable range. Stability studies showed that SLNs and NLCs were stable for 1 month at 4 oC, and the prepared formulas displayed a sustained GFT release pattern for 24 h. GFT-loaded nanocarriers showed a significant increase in cytotoxicity against the A549 cell line compared to free GFT.
Conclusions: Decorated GFT-loaded lipid nanocarriers are a promising approach for selectively targeting of GFT into cancer cells

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Abstract Code: 087

Effect of Kaolin on microbial biofilm of enteric bacteria

Student(s) Name: *Wafa'a M.Albakr , Raghad H.Alqahtani*
Supervisor(s) Name: *Fadilah S.Aleanizy*

Abstract:
Background: Kaolin is made up of the clay mineral kaolinite, a soft white or yellowish lumps, insoluble in water. Kaolin contains 47% of silica, 40% of aluminia, and 13% of water. Its adsorption properties allow it to act as a drying and antidiarrheal agent. The aim of this study is determine the effect of kaolin on bacteria growth and virulence as biofilm formation.
Methods: *P.aeruginosa, B.subtilis, Klebsiella, E.coli, S.aureus, Proteus, Salmonella,* were cultured in Mueller-hinton broth. Bacteria growth were examined by comparing culture supplemented with 5% kaolin to control culture with no addition of kaolin. Biofilm formation done using microtiter dish were bacteria grown in presence or absence of kaolin then stained to check and compare.
Results: The results indicated that kaolin particles stimulated bacteria activity for biofilm production in all studies strains, however, the increase were significant for *P.aeruginosa* and *B.subtilis*, were (P=.018) and (P=.008) respectively, whereas it was insignificant increase for the remaining strains (P>.05). The association between kaolin and bacterial growth was also studied and showed significant decrease in all strains (P<.0001), yet, further validation of bacterial growth suggest enhancement so this results could be explained by the interaction between kaolin particles and bacterial cells lead to interpreting the decrease in growth reading due to adsorption of bacteria on kaolin pours.
Conclusions: The results suggest that the kaolin particles enhance microbial activity and enhanced biofilm formation. So, kaolinite serve as catalyst not only as the microbial growth-supporting media but also in the proliferation of microbial virulence.

Abstract Code: 088

Is social media stress shortening our telomeres?

Student(s) Name: *Layan A. Alkahtani*
Supervisor(s) Name: *Raha S. Orfali, Aliyah A. Almomen, Homood M. As Sobeai, Monira M. Alwhaibi*

Abstract:
Background: Stress is a highly damaging physical and mental disorder. Stress in all its forms affects a crucial section of our chromosomes, and that is the telomere. Telomeres naturally decline in length with each cell replication however, it was proven that stress contributed to a faster rate of telomere shortening. This study consists of two parts: the impact of social media stress on participants' and its effect on telomere length.
Methods:
Inclusion criteria comprised healthy individuals, age range of 18-35 years. The questionnaire was designed to identify the main aspects of social media's influence on the participants' lives. The questionnaire was assembled based upon a similar survey where the perceived stress scaling system was used. The questionnaire was then validated through peer review. Saliva samples were collected, and telomere length will be measured using a qPCR.
Results: Preliminary data found those suffering from a health condition had a mean age of 23.6, whereas those who did not were at a mean age of 26.26 (p=0.035). Out the 16 that reported health issues, 10 spent more than 2 hours a day on social media, in comparison to 6 that spent 1-2 hours(P=0.03), 13 participants expressed that stress was part of their daily lives, and 6 had agreed that social media was worsening their health (p=0.04)**.**
Conclusions: Results indicated that age, hours spent on social media, and stress all affected the participants health. The measurement of telomere length is now ongoing and will be tied to the participant's stress score.

Abstract Code: 089

The Status of Infectious Disease Content in the Professional Pharmacy Curriculum in Saudi Arabia: Results of National Survey

Student(s) Name: *Safiah H. Alattas*
Supervisor(s) Name: *Fulwah H. Alqahtani*

Abstract:
Background: The growth of infectious diseases (ID) made it necessary for health professionals to be aware

and well educated in the subject. This study aims to assess in ID subjects covered in pharmacy curriculum in Saudi Arabia (SA), evaluate strategies of teaching, and assessment of students' knowledge of ID.
Methods: A 26-item questioner was sent for ID faculty members at 26 Saudi pharmacy colleges included demographic questions for the faculty, the ID topics and its dedicated hours. Also, it covered the tools and strategies used in the courses for better understanding of students' assessment, along with the faculty members current satisfaction and their future plans for the curriculum.
Results: The survey was completed by ID faculty, department chairs or deans of college. 85.5% of participants were from governmental colleges. The majority of colleges 98.2% have a semester format schedule with 67.3 % have solely PharmaD program. Greater than 78.2% of respondents covered all of tier one ID topics from American college of clinical pharmacy (ACCP) pharmacotherapy dedicated curriculum toolkit. The main tool utilized for teaching was through lectures 94.5%. Patient case application took the highest percentage in teaching strategy that used constantly with 54.5%. 63.4% of respondent faculty thought that the curricula was adequate when they were asked about their judge of the curricula coverage.
Conclusions: According to our knowledge this is the first study to assess ID curricula among Saudi pharmacy colleges. This study might suggest an increased effort to standardize ID curricula in pharmacy colleges in SA.

Abstract Code: 090

Anti-Oxidant and Anti-Apoptotic Effects of Oxytocin Against Cisplatin-Induced Neurotoxicity in PC12 Cells

Student(s) Name: *Abdulrahman Alkhuraiji, Mohammed Bin buraykan.*
Supervisor(s) Name: *Mohammed Mufadhe Alanazi*

Abstract:
Background: Cisplatin is an effective antineoplastic agent. However, neurotoxicity is one of its dose-limiting adverse effects. Oxytocin (OXT), is a neuro-peptide has been implicated in several vital physiological processes, and in protection against apoptosis, inflammation, and oxidative stress in many tissues, including brain. We hypothesized that OXT protects PC12 cells against cisplatin-induced oxidative stress and apoptosis.
Methods: Cells either pretreated with OXT or with culture medium then exposed to cisplatin for different times based on the experiment. The protective effect of OXT was evaluated by MTT assay. While, the anti-oxidant effect of OXT was investigated by measuring the reactive oxygen species (ROS) generation using DCFDA assay. To demonstrate the anti- apoptotic effect of OXT, we employed the western blotting (WB) technique by measuring the expression of the mitochondrial apoptosis proteins (bcl-2 and bax).
Results: This study shows that treating the cells with cisplatin increased ROS generation, decreased the expression of the anti-apoptotic protein (bcl-2), and increased the expression of pro- apoptotic protein (bax) significantly compared to the control group. On the other hand, pretreating cells with OXT blunted the increase in ROS generation, and reverted the decrease in the bcl-2 and the increase in the bax protein expression significantly compared to the groups treated with cisplatin alone.
Conclusions: Our results indicate that OXT has protective effects against cisplatin-induced neurotoxicity in PC12 cells. This protective effect of OXT is mediated by anti-oxidant and anti-apoptotic effects through modulating the mitochondrial apoptosis pathway.

Postgraduates

Pharmacy Practice and Pharmacotherapy

Abstract Code: 100

Evaluation of Caspofungin Utilization Patterns in Adult Patients at a Tertiary Hospital: A Retrospective Study

Student(s) Name: *Abrar Fayez Alshehri*
Supervisor(s) Name: *Thamer Almangour, Abdullah A. Alhifany, Abdulaziz Alhossan*

Abstract:
Background: There is a gab of knowledge in primary literature about the utilization of caspofungin use despite its high potential to cause medication error due to its difficult dosing. Therefore, the evaluation of caspofungin utilization is needed. The aim of this study is to evaluate the utilization pattern of caspofungin in an academic tertiary care hospital in Riyadh, Saudi Arabia.
Methods: This is a retrospective study, conducted at King Saud University Medical City, Riyadh, Saudi Arabia, Adult patients whom received caspofungin from January 2015 to December 2018 were included. The appropriate use of caspofungin was evaluated

according to the international guidelines and approved recommendations. The dose was evaluated according to the approved loading and maintenance doses, hepatic dose adjustments for cirrhotic patients, and drug-drug interactions that required dose adjustments. Cultures and laboratory tests were used to evaluate the appropriate duration of caspofungin therapy.

Results: 388 patients were included. Caspofungin was inappropriately used in 253 (65%) patients. This included 78 (20%) patients whom had an inappropriate indication, 165 (43%) patients whom had an inappropriate dosage, and 10 (3%) patients whom had an inappropriate duration of therapy. Interestingly, (61/388) 15% patients were adjusted without present of any justification for dose adjustment. Moreover, missing of loading or maintenance doses were seen in (86/388) 25% of patients. Caspofungin inappropriate indication were mainly due to unknown indication in (40/388) 10% of patients.

Conclusions: The use of caspofungin in our institution was highly inappropriate. Hence, developing an antifungal stewardship and drug restriction program is highly recommended.

Social Pharmacy and Pharmaceutical Outcomes

Abstract Code: 101

Incidence and Factors Associated with Prescribing Errors at Intensive Care Units in a Tertiary Academic Hospital

Student(s) Name: *Miesoon Alrojaie*
Supervisor(s) Name: *Mansour Almetwazi*
Co-Supervisor(S) Name: Abdullah Alhammad, , Nourah Alagl, Huda Alzahrani

Abstract:

Background: Prescribing errors (PEs) are preventable medication errors. Patients who are admitted to intensive care units (ICUs) are receiving various interventions and medications. This study aimed to determine the incidence of prescribing errors, and the possible factors that associated with the increased incidence of prescribing errors in ICUs.

Methods: A retrospective cross-sectional study was conducted at ICUs of a tertiary academic hospital in Riyadh, Saudi Arabia. Medications orders and pharmacists' interventions during November and December of 2019 were assessed in all ICUs settings (pediatrics and adults), by using patients' medical records. Factors included patients' genders and ages, workdays, shifts, and prescribers' genders were collected and analyzed. Descriptive analysis, such as fisher exact and chi-square were used as appropriate. Regression analysis were used to assess the factors associated with PEs.

Results: A total of 3080 orders during November and December of 2019 were included. The results revealed a 57 of PEs (1.85%). Although there was no significant difference between ICUs, Surgical Intensive Care Unit (2.71%) followed by Cardiac Intensive Care Unit (2.09%) were found the most settings of PEs. The results showed that PEs occurred the most with antibiotics class (42%) followed by PPIs (14%). Therapeutic duplication (29%) was considered the most common type of PEs. Regression analysis showed no significant factors to be associated with PEs.

Conclusions: Prescribing with therapeutic duplication and antibiotics class were the most PEs in ICUs. There were no factors to contribute more with PEs. Further data are needed to assess the factors.

Abstract Code: 102

Healthy Diet and Recovery Time From COVID-19

Student(s) Name: *Shahd I. Khan*
Supervisor(s) Name: *Omar A. Almohammed*

Abstract:

Background: While the world is in dire need of an effective medicine to treat coronavirus disease-19 (COVID-19), a healthy lifestyle is commonly assumed as a promoter of the human body's response to infectious diseases. However, its applicability to specific infections should be supported by evidence.

Methods: A cross-sectional study among COVID-19 survivors was conducted between June-September 2020. The study recruited participants from the Ministry of Health database of Saudi Arabia. Participants were verbally interviewed. A questionnaire was developed to assess the participants' dietary habits based on the 2015 Dutch food-based dietary guidelines and the time to recovery from COVID-19

Results: A total of 768 COVID-19 survivors have participated in the study, where 237 (32.1%) were hospitalized and 501 (76.9%) were not hospitalized. Overall, there was no significant difference in diet score between males and females; however, healthy diet scores for Saudis were significantly lower than non-Saudis. Among the non-hospitalized patients, eating a healthier diet was associated with a shorter duration of recovery ($p < 0.05$). Moreover, this was significantly affected by gender (15.8 [±9.3] male vs. 12.1 [±8.9] female; $p < 0.001$) and marital status (12.1

[±8.4] singles vs. 13.7 [±9.3] married vs. 16.1 [±11.8] divorced; $p < 0.05$). Whereas no significant correlation was found with age or BMI.

Conclusions: The data from this study indicated that eating a healthier diet was associated with a shorter duration of recovery from COVID-19. However, further studies are required to thoroughly investigate the relationship between diet and duration of recovery from infectious diseases.

Medicinal Chemistry and Natural product

Abstract Code: 103

Neuroprotective Effect of *Dodonaea viscosa* Growing in Saudi Arabia Against Cerebral Ischemia, in *vivo* Study

Student(s) Name*: Omer Mohammed Almarfadi*
Supervisor(s) Name: *Nasir A. Siddiqui and Abdelaaty Shahat*

Abstract:

Background: Stroke is accounted for the third commonest cause of death worldwide. Some herbs containing bioactive compounds have been demonstrated to be an effective alternative to conventional treatments for neuroprotection. This study aimed to determine the neuroprotective potential of *Dodonia viscosa* growing in Saudi Arabia against brain ischemia caused by transient focal ischemia/reperfusion (I/R) injury in the brain of rats.

Methods: 24 male Wistar rats were randomly divided to equally four groups: normal, middle cerebral artery occlusion (MACO) operated, (MACO + Dodonia viscosa extract (DVE) 150 mg/kg/d) and (MACO + DVE 300 mg/kg/d) groups. After 30 days of oral DVE pre-treatment. Ischemia reperfusion (I/R) proceeded for 24 h following 45 min MCAO and the rats were sacrificed. The brain samples were prepared for biochemical, western blot and histopathological analyses.

Results: DVE showed antioxidant activity through significant reduction of malondialdehyde (MDA) level and elevation of antioxidant levels (superoxide dismutase (SOD), catalase (CAT), glutathione (GH) both P<0.05). Besides, it exhibits an anti-inflammatory effect resulting from a significant reduction of tumor necrotic alpha (TNF-α), interleukin-6 (IL-6) and nuclear factor-kappa b (NF-kB) levels both P<0.05. Furthermore, it regulated apoptotic activity through a significant upregulation of anti-apoptotic B cell lymphoma-2 (Bcl-2) protein and downregulation of pro-apoptotic Bcl-2 associated X protein (BAX) and caspase-proteins both P<0.05. DVE also significantly reduce infarction volume (P<0.05).

Conclusions: DVE showed potent neuroprotective activity against R/I-induced injuries caused by transient focal cerebral ischemia in rats. According to the findings, DVE may be a useful adjuvant supplement in treatment of stroke

Abstract Code: 104

Chemical Investigation and In Vitro Anti-Cancer Evaluation of the Soft Coral Litophyton Arboreum

Student(s) Name: *Abdullah Abdulrahman Al Ahmari*
Supervisor(s) Name: *Atallah F. Ahmed*

Abstract:

Background: Marine invertebrates, including soft corals, are considered promising source of structurally unique natural products. The need for discovery of new biologically active drugs has prompted us to chemically and biologically investigate one of Red Sea soft corals, Litophyton arboreum. Previous investigation on soft corals belonging to genus Litophyton disclosed metabolites of various chemical structures, including steroid, diterpenoid and sesquiterpenoid derived metabolites, of which some compounds possess potential cytotoxic activity.

Methods: L. arboreum. was extracted with ethanol. The solvent-free extract was fractionated by liquid– liquid extraction method (into dichloromethane- (LADC), ethyl acetate-, and n-butanol-soluble fractions). A chromatographic fractionations of LADC over vacuum flash silica gel column afforded 12 sub-fractions. NMR and GC-MS measurements were employed to recognize the chemical nature and composition of the metabolites exist in the LADC subfractions (F01-F12). MTT assay was used to evaluate the anti-cancer activity of certain LADC fractions against the growth of a limited panel of cancer cell lines (A549, LoVo, and MCF-7).

Results: Based on the GC-MS (of F01-F04) and NMR measurements, the nature of the LADC fractions (F01-F12) could be identified as a mixture of terpenoid and steroidal metabolites of different chemical structure. LADC fraction showed anti-cancer activity against the tested cancer cell lines, in a dose dependent manner. The IC50 values were 22.5, 42 and 36.5 µg/mL against A549, LoVo and MCF-7, respectively. Furthermore, F09 was tested against the same cancer cell lines showing strong anti-cancer activity with IC50 of 11.5 µg/ml. The ethyl acetate and n-butanol fractions were not significantly active (IC50 >30µg/ml).
Conclusions: The L. arboreum LADC fraction of ethanol extract investigated in this study appears to have a promising metabolite with anti-cancer activity which will encourage us for further investigation and identification of the compounds responsible for this activity.

Experimental Therapeutics and Toxicology

Abstract Code: 105

Evaluation of the Inhibitory Mechanisms of Losartan and Vitamin D on Amiodarone-Induced Lung Inflammation in Rats: Role of Mitogen Activated Protein Kinases/Activator Protein-1 Pathway

Student(s) Name: *Sara Abdulaziz Al-Hassan*
Supervisor(s) Name: *Hala Abou El-Fetouh Attia, Hatun abadulhamid Al-Omar*

Abstract:
Background: Amiodarone (AMD), a potent antiarrhythmic drug, is used cautiously due to its lung toxicity that is characterized by alveolar inflammation and fibrosis. The activation of alveolar macrophages and the imbalance in cytokines produced from T-helper-1 (Th1) and Th2 cells contribute for AMD-induced inflammation. The role of mitogen-activated protein kinases (MAPKs)/ activator protein-1 (AP-1) inflammatory pathway is still unknown. The objectives of the study were to study the role MAPKs/AP-1 on the AMD-induced lung inflammation and to evaluate the protective effects of losartan and/or vitamin D.
Methods: Rats were divided into control group, AMD group (30 mg/kg/day) and treated groups received losartan (15 mg/kg/day), vitamin D (5 µg/kg/day) and their combination concomitantly with AMD for four weeks. The following were determined, tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), interferon gamma (IFN-γ, the major cytokine of Th1), IL-4 (the principle cytokine of Th2 cells), CD68 (the hallmark of macrophage activation), and phosphorylated -JNK, p-ERK1/2, p-p38 and p-AP-1 (the components of MAPKs).
Results: AMD resulted in significant reduction of IFN-γ along with marked elevations of TNF-α, IL-6, IL-4 and positive immunostaining of CD86 as well as activation of MAPKs/AP-1 pathway. This inflammatory response was confirmed by the inflammatory cell infiltration in the lung. These abnormalities were significantly mitigated by losartan and to greater extent by vitamin D and the combination.
Conclusions: Our study revealed the contribution of MAPK1/AP-1 in the AMD-induced inflammation. Vitamin D alone or in combination with losartan could be used effectively to prevent lung toxicity in patients treated with AMD.

Others

Abstract Code: 106

Molecular and Clinical Features of 17 Ataxia Telangiectasia Patients: Report of a Novel Compound Heterozygous Variant, a Known Founder Mutation, and Two Known Mutations

Student(s) Name: *Hanouf O.AlDeeb*
Supervisor(s) Name: *Maha M. AlRasheed, Hadeel Alkofide, Namik Kaya*

Abstract:
Background: Ataxia telangiectasia (AT) is a rare autosomal recessive multi-systemic disorder. It usually presents in toddler years with progressive ataxia and oculomotor apraxia, or less commonly, in the late-first or early-second decade of life with mixed movement disorders. Biallelic mutations in Ataxia Telangiectasia Mutated gene (*ATM*) cause AT phenotype, a disease not well documented in Saudi Arabia, a highly consanguineous society. Therefore, we aimed to investigate the variants and mutations in ATM in Saudi Arabia by describing the first Saudi AT cohort.
Methods: We studied several Saudi AT patients, identified *ATM* variants, and investigated associated clinical features. We included 17 patients from 12 consanguineous families. All patients had comprehensive clinical and radiological assessment, and most were examined through whole-exome

sequencing (WES). Selected individuals were analyzed using various genetic approaches.
Results: We identified 4 different *ATM* variants in our patients: 3 previously reported mutations, and one novel variant. Nearly all patients had classical AT presentation except for two patients with a milder phenotype. Among the 3 known variants, a deletion causing truncation (c.381delA resulting in p.Val128Ter) was identified in 13 patients. Two patients harboured the other 2 variants, (c.9001_9002delAG resulting in p.Ser3001Phefs*6) and (c.9066delA resulting in p.Glu3023Alafs*10). We speculate that c.381delA is a founder mutation in our population.
Conclusions: This study extends the AT genotypic spectrum and confirms a genotype-phenotype relationship. Our findings may contribute to improvement in clinical care, therapy, genetic screening and counseling.

Abstract Code: 107

Utilizations and Expenditures of Tumor Necrosis Factor Alpha Blockers: A cross sectional study from a Private Hospital in Saudi Arabia

Student(s) Name: *Muteb Aldaraam*
Supervisor(s) Name: *Ahmed Alghamdi*

Abstract:
Background: Tumor Necrosis Factor Alpha blockers (anti-TNF) are effective drugs used in the treatment of several inflammatory disorders. The objective of this study was to evaluate the utilization and expenditures of anti-TNF drugs in Saudi Arabia.
Method: This was a retrospective cross sectional study using local data obtained from large private hospital in Riyadh for the year 2020. Drug utilization and expenditures data were collected from patients' medical record and included (demographics, disease characteristics, medications, labs, visits, type of clinic). Direct medical costs associated with anti-TNF including costs of acquisitions, administration, and monitoring, were estimated. Descriptive statistics were performed.
Results: A total of 140 patients were included in this study, with a mean age of 41 years and 53% were females. Five anti-TNF drugs were marketed in the Saudi Arabia by 2020 (Adalimumab, Certolizumab, Etanercept, Golimumab and Infliximab). Adalimumab and Etanercept were the most commonly prescribed anti-TNF and accounted for 72%, and 14% of the total claims respectively. Anti-TNF drugs were commonly prescribed by rheumatologists followed by gastroenterologists and dermatologists (70%, 15%, 10.7%) respectively. The total expenditures of anti-TNF was SAR 5,988,075 with an average annual cost of SAR 42,170 per patient. The average copaymet per claim paid by insured patients ranged from SAR 87 for Certolizumab to SAR 340 for Adalimumab.
Conclusion: Anti-TNF drugs had a substantial economic burden to the healthcare system. Utilizations and expenditures for anti-TNF drugs were higher among rheumatology and gastroenterology patients. Increasing the uptake of anti-TNF biosimilirs may help lowering the overall costs and improve the economic value.

YPHRA

Pharmacy Practice and Pharmacotherapy

Abstract Code: 111

Optimization of Vancomycin Dosing Regimen in Cancer Patients using Pharmacokinetic /Pharmacodynamic Modeling

Student(s) Name: *: Meshari A. Alqahtani, Faisal T. Alzamil*
Supervisor(s) Name: *Saeed A. Alqahtani*

Abstract:
Background: Gram-positive bacterial infections are one of the major causes of mortality and morbidity in cancer patients. Hence, the challenge lies in regulating the pervasive use of vancomycin in the management of infections facing such patients due to the anomalous vancomycin pharmacokinetics (PKs) and pharmacodynamics (PDs). Inappropriate vancomycin exposure is associated with toxicity, pathogen resistance, and therapeutic failure.
Objectives: To estimate vancomycin PK in patients with and without cancer. The standard dosage regimens of vancomycin were then evaluated using data from PK modeling.
Methods: Data were extracted from a matched patient cohort of those with and without cancer. Pharmacokinetic analysis was performed using Monolix version 4.4, and the PK parameters were compared in both groups. The standard and suggested vancomycin dosing regimens were evaluated using PK/PD modeling and Monte Carlo Simulations.
Results: In total, 448 blood samples were analyzed from 147 patients, of which 73 patients had cancer and 74 patients were noncancer patients. In general, no

significant differences were observed between the two groups in all characteristics except for the vancomycin levels, which were significantly lower in cancer patients (p=0.00104). This analysis showed that cancer patients showed a significantly higher vancomycin clearance than noncancer patients (p=0.002), whereas the volume of distribution (V) was similar in both groups (p=0.83). These data showed a higher maintenance dose of vancomycin is required to achieve the PD target.
Conclusions: The findings showed the cancer patients have lower levels of vancomycin due to higher clearance than noncancer patients. Thus, higher doses may be needed.

Social Pharmacy and Pharmaceutical Outcomes

Abstract Code: 112

Job stress and physical and mental wellbeing among female pharmacists working in private sector in Saudi Arabia

Student(s) Name: *Sarah K. Sayed*
Supervisor(s) Name: *Hussain A. Al-Omar, Wael S. Mansy , Azhar M. Arfa*

Abstract:
Background: Since the beginning of the 20th century, work stress has been a major topic for researchers and practitioners working in the fields of organizational behavior and health and medicine. Evidence shows that work-related stress has a negative impact on employee job performance, and their physical and psychological well-being and operational efficiency. This study sought to describe the levels of workplace stress among female pharmacists who are working in pharmaceutical private sector.
Methods: A web-based survey of randomly selected female pharmacists incorporating a pre-validated instrument that measures organizational stress screening tool known as a shortened stress evaluation tool (ASSET). It includes 63 items on job stress perceptions, psychological and physical well-being, and attitude of pharmacists toward their organizations. Respondents were asked to rate the responses using three Likert scales. Descriptive statistics were performed using IBM SPSS® v24.
Results: A total of 232 female pharmacists participated in the study. Of the total respondents, 53.9% were from pharmaceutical company, 25% were from community pharmacy. Female pharmacists' had moderate perception about their job related stressors (2.74±1.58) and their physical and mental health is mildly-to-moderately (2.09±0.98) impacted by work stressors.
Conclusions: Limited evidence is available regarding female pharmacists' job stress and physical and mental well-being in Saudi Arabia. Female pharmacists reported moderate levels of job-related stress in this study. Future research should continue to refine these relationships to further enhance our understanding of the effects of job stress and physical and mental well-being on female pharmacists who are working in the private sector.

Abstract Code: 113

Job choice motivation and attitude among female pharmacists working in private sector in Saudi Arabia

Student(s) Name: *Rehab M. Almutairi*
Supervisor(s) Name: *Hussain A. Al-Omar, Wael S Mansy; Azher M Arafah*

Abstract:
Background: The scope of pharmacy profession, as well as the primary role of the pharmacist, has greatly evolved. In recent years, a growing number of female pharmacists have joined a wide range of private pharmacy professional settings as they can be seen as one of the most rewarding and challenging career choices. The objective of this study is to explore the most important factors that motivate female pharmacists to join private pharmacy sector in Saudi Arabia.
Methods: A web-based survey of randomly selected female pharmacists who are working in different private pharmaceutical settings such as community pharmacy, private hospital pharmacy, pharmaceutical industry and pharmaceutical companies. Participants were asked to choose one or more factor(s) from a list of intrinsic and extrinsic motivational factors that was developed from the literature. Descriptive statistics were performed using IBM SPSS® v24.
Results: In total, 232 female pharmacists participated in the study. Of the total respondents, 53.9% of the participant were employees of pharmaceutical companies. The most important factors were opportunity to learn new skills (93.5%), fulfilling a sense of achievement (89.2%), enjoying interaction with others (89.7%), enhancing their social status (88.8%)and recognition, appreciation and rewarding (88.8%).
Conclusions: The rising influence of Saudi female pharmacists in private healthcare market is a topic that cannot be overstated. This study showed that female pharmacists, in their early careers, had mixed views on their motivational factors. Supporting and empowering the professional growth of Saudi female

pharmacists is now inexorably linked to the future of the profession.

Abstract Code: 114

Cost-effectiveness of Ribociclib in HER2-negative Breast Cancer: A Systematic Review.

Student(s) Name: *Wedad H. Alotaibi; Majed M. Alhamdan*
Supervisor(s) Name: *Bander S. Balkhi*

Abstract:
Background: Breast cancer is a common global health issue among women. The costs of breast cancer per patient in one year were $71,909, $97,066, $159,442, and $182,655 for disease stage at diagnosis 0, I/II, III, and IV, respectively. Multiple treatment options were found to treat women HER2-negative advanced breast cancer. Ribociclib indicated for advanced stage or metastatic breast cancer women with HER2- negative. The value of this medication is debatable. Hence, the objective of this study is to investigate the value of Ribociclib in the treatment of patient with breast cancer by assessing the published cost effectiveness evidence.
Methods: A systematic review of the published literature was conducted to identify economic evaluations/cost effectiveness study of Ribociclib. In this study several databases were inspected, including PubMed, NHS Economic Evaluation, Cochran and Scopus. Studies were eligible if they assessed the cost effectiveness of Ribociclib and reported incremental cost effectiveness ratio (ICER). The study was performed and conducted in accordance with the PRISMA reporting guidelines.
Results: Of 70 studies identified, 8 articles meet our inclusion criteria. The cost-effectiveness threshold varied from $24,144.18 (€20,000) in Spain to $198,000/QALY in the USA. Moreover, the result demonstrated that the mean ICER were varies across different countries $1,863.47/QALY (€1,543.62/QALY) in Spain and $813,132/QALY in the USA.
Conclusions: Among all CDK4/6 inhibitors medications, current evidence indicated that the use of Ribociclib for HER2- negative breast cancer management was beneficial and considered to be cost effectiveness. Future research is needed to investigate the role of Ribociclib in long-term treatment.

Abstract Code: 115

Job Satisfaction among Female Pharmacists Working in Private Sector in Saudi Arabia.

Student(s) Name: *Wedad H. Alotaibi*
Supervisor(s) Name: *Hussain A. Al-Omar; Wael S. Mansy; Azher M. Arafah*

Abstract:
Background: Pharmacists' job satisfaction has been of interest for many years and is of great importance in several aspects. Job satisfaction has implications for employee mental health well-being, turnover, organizational effectiveness, and absenteeism. We aim to describe the level of job satisfaction among female pharmacists who are working in private pharmaceutical sector.
Methods: A web-based survey of randomly selected female pharmacists incorporating a pre-validated satisfaction scale, the Warr–Cook–Wall scale, was adapted and administered. It includes 16 items asking respondents to rate the extent to which asses the degree of job satisfaction on a seven-point Likert type rating scales (from 1 = extremely dissatisfied to 7 = extremely satisfied), with a high satisfaction score. Descriptive statistics were performed using IBM SPSS® v24.
Results: A total of 232 respondents were participated in this study with a mean age of 26.09 years ± 2.44. Average satisfaction score was 4.63 ±1.99. Furthermore, a high percentage of pharmacists were generally satisfied with the amount of responsibility than been assigned to them (64.7%), working with their immediate director/manager (64.6%), the recognition they receive for good work (63.7%), job security (59.9%).
Conclusions: Female pharmacists were satisfied with their current jobs in private sector. Understanding the sources and extent of job satisfaction experienced by female pharmacist workforce is likely to empower and support Saudi female pharmacists role in private healthcare market in Saudi Arabia and enhance their productivity.

Abstract Code: 116

Assessment of Knowledge, Attitude and Practice of Security and Safety Workers towards COVID-19 Pandemic: A Cross-Sectional Study

Student(s) Name: *Hala F. Almarzouqi, Gadah K. Alonazi*
Supervisor(s) Name: *Maha M. AlRasheed, Abdullah M. Alsugair , Fadilah .S. Aleanizy , Fulwah Y. Alqahtani, Gamal Alshazli , Fowad Khursheed*

Abstract:
Background: At the end of December 2019, a novel virus (SARS-CoV-2), termed COVID-19 has spread widely with substantial clinical impact. Therefore, to minimize the spread of the virus, preventive measures

as recommended by competent authorities are of utmost significance. Adherence to the recommended measures is largely determined by the knowledge, attitudes and practices (KAP) of community. The security sector is an essential part of an effective and comprehensive pandemic response, and has played an important role in supporting public compliance with lockdown restrictions. Hence, this study aimed to assess the KAP of security and safety workers towards COVID-19 pandemic in Saudi Arabia.

Methods: A cross-sectional survey was conducted between April and July 2020 using a self-developed structured questionnaire that was randomly distributed online among security and safety employees in government or private sectors.

Results: Among 712 participants, 53.9% were female and the respondents mean age was 39.43 years. Television was chosen as the most reliable source of information by 75.0% of the participants. Most respondents had sufficient knowledge about the COVID-19 pandemic, as the majority of them answered the knowledge questions correctly. The significant predictors for their knowledge were their educational level, age, marital status, parenthood status and employment sector (private or government). Our study revealed an overall 98.6% positive attitude of safety and security workers towards COVID-19. Majority of the respondents were following good and safe COVID-19 prevention practices.

Conclusion: High level of knowledge was reflected in both the attitude and practice of the participants towards COVID-19 pandemic.

Abstract Code: 117

Frontline vs Non-Frontline Healthcare Workers' Knowledge, Attitude and Practice Towards COVID-19: A Cross- Sectional Study

Student(s) Name*: Amani H. AlShahrani, Sara A. AlMuhaini*

Supervisor(s) Name: *Maha M. AlRasheed, Hadeel A. AlKofid, Tariq M. AlHawassi*

Abstract:

Background: The recent COVID-19 outbreak has mandated governments worldwide to implement regulations to contain it. Proper execution of these regulations by particularly frontline health workers (FHWs) requires their understanding of the various disease-related aspects to facilitate effective mitigation of its spreading into an uncontrollable occurrence.

Methods: We investigated knowledge level, attitude and practice on COVID-19 management in 264 FHWs compared with 164 non-frontline workers (NFHWs).

Results: The median knowledge score was [8(25^{th} - 75^{th} percentiles: 7-9); P=0.26] and attitude score [26(21- 32); P=0.38]. Predictors of good knowledge were <20 years work experience (OR: 2.05; P=0.04) and <50% working in clinical practice (Odds Ratio(95% confidence interval): 1.72(1.12-2.66); P=0.01), which were inversely related to the paramedical professions (OR=0.45; P=0.001) and working in a university hospital (OR=0.51; P=0.004). Pharmacist profession [2.9(1.53-5.6), P=0.001], <20 years working experience [2.2 (1.15- 4.21); P=0.017], providing information related to disease prevention and institutional preventative measures [1.82(1.12-2.95], P=0.016) and highest degree from Canada [9.15 (1.12-74.85), P=0.039] were associated with a good attitude. The median practice score [22(18-28); P=0.03] was higher among the NFHWs. The only predictor of good practice was the workplace being university hospitals [3.39(2.06-5.59), P<0.001] and military hospitals [1.84(1.02-3.3), P=0.04]. Good knowledge was associated with a good attitude (rho: -0.28; P<0.001), while attitude correlated positively with practice (rho: 0.35; P<0.001).

Conclusions: Health workers displayed good knowledge about the disease in general. Rather, profession and working experience constituted predictors for adequate knowledge, positive attitude or appropriate practice of stipulated policies towards the management of the disease.

Abstract Code: 118

Trends in the Registration of Therapeutic Biologics in Saudi Arabia in the Period from 1989 To 2019

Student(s) Name*: Saleh Mohammed Alsaqoub, Abdulrhman Emad AlQuifly*

Supervisor(s) Name: *Hussain Abdulrahman Al-Omar, Reem Dhyan Almutairi*

Abstract:

Objectives: Therapeutic biologics are produced in living cell cultures or through genetic engineering of proteins. They have been approved for the treatment of several diseases, such as Rheumatoid Arthritis, Multiple Sclerosis, Crohn's Disease, Psoriasis, and Cancer. The objective of this study was to assess the trends in therapeutic biologics registered in Saudi Arabia in the period from 1989 to 2019.

Methods: Regulatory information on biologic license applications (BLA) registered in the period of analysis was collected from the Saudi Food and Drug Authority (SFDA) website "Registered Drugs and Herbal Products". Information collected included: BLA number, brand and non-proprietary names, form, strength, registration date, legal status, marketing

company, and authorization status. Descriptive statistics were performed using IBM® SPSS® V.24 software.
Results: In total, 66 therapeutic biologics products were registered in the SFDA website with 109 different formulations/strengths in the period of 1989-2019. There were 5 biologics (7.5% of the total) registered in the period of 1989-1994, 1 (1.5%) in 1995-1999, 4 (6.06%) in 2000-2004, 5 (7.5%) in 2005-2009, 13 (19.6%) in 2010-2014, and 38 (57.5%) in 2015-2019. The largest number of registrations occurred in the class of Antineoplastic and Immunomodulating Agents (n=47), followed by Blood, Blood Forming Organs (5) and Alimentary Tract, Metabolism (4). All the approved biologics had parenteral route of administration.
Conclusions: There was a substantial increase in the trend of therapeutic biologics registration in Saudi Arabia. Most of the registrations occurred in the last 4 years.

Abstract Code: 119

Raising Awareness of Freshly-Graduated Pharmacy Students of Common Patients'-Known Terms, Marks and Characteristics of OTC Drugs Aids in Overcoming Community Pharmacy Challenges of Practice:

Student(s) Name: *Reem O. Elagi*
Supervisor(s) Name: *Rayan A. Ahmed*

Abstract:
Background: Freshly-graduated pharmacy students in Saudi Arabia start shifting to work in the community pharmacies comparing to other pharmacy working sectors. Being less confident, spending long dispensing time, making errors during dispensing process, miscommunication with patients are some of the challenges encountered by students during working in the community pharmacies.
Methods: We assessed whether there is lack in knowledge of names, characters and marks of OTC drugs known by the patients in the Jazan flora and its impact on dispensing process and overall students' performance. However, we intervene by giving a lecture containing around a hundred of names, characters and marks of the OTC drugs known by the patients in the Jazan flora. The materials used for generating the lecture were collected from numerous randomly selected pharmacies in Jazan region. To see intervention role in resolving these issues, we re-assessed the participants' knowledge and the overall act in the pharmacy. The study was conducted utilizing patient, pharmacist and pharmacy-stimulated scenario (online sitting). Participant's responses were registered as time require to prepare three prescriptions, errors numbers made and the level of satisfaction (pre-intervention and post-intervention).
Results: This study showed that there were significant changes in dispensing time, dispensing errors number and increase the satisfaction level after intervention as compared to pre-intervention groups.
Conclusions: Encouraging recently-graduated students to be familiar with those marks, characters and names of OTC marketed drugs known by the patients might help in drugs dispensing process and increase the overall performance in the community pharmacies.

Experimental Therapeutics and Toxicology

Abstract Code: 120

E-cigarette aerosols containing nicotine modulate vesicular glutamate and GABA transporters as well as neurobehaviors in chronically exposed C57/J6 mice

Student(s) Name: *Abdullah M alghamdi ; Aban A Kadi ; Bassil S Allahim*
Supervisor(s) Name: *Fawaz F Alasmari*

Abstract:
Background: Studies documented that nicotine exposed models exhibited neurobehavioral changes relating to alterations in neurofunctions. Previous studies showed an alteration in Glutamate, Dopamine and Gamma-aminobutyric acid (GABA) following nicotine exposure. Vesicular Glutamate Transporter (VGLUT-1) and Vesicular GABA transporter (VGAT) are essential in the transport of these neurotransmitters from presynaptic neurons into the synaptic cleft. Findings in preclinical models indicated dysregulation in levels of neurotransmitters in exposed to nicotine. However, the effects of nicotine-containing electronic cigarettes on proteins such as VGLUT-1 and VGAT have not been elucidated.
Methods: C57/J6 mice were exposed to vapor-delivering device containing nicotine (25mg/ml) for four weeks. Novel-object, locomotion, and Y-maze tests observe behavioral paramteres. Western blotting and immunohistochemistry assays to determine VGLUT-1, VGAT and postsynaptic density protein 95 (PSD95) levels in the hippocampus. Ultra-performance liquid chromatography-tandem mass spectrometer (UPLC-MS-MS) was used to detect nicotine and cotinine (a nicotine metabolite) levels in the serum.

Results: Aerosols containing nicotine modulated memory recognition behaviors, as demonstrated using Novel-object and Y-maze tests post nicotine exposure. Chronic exposure increased VGLUT-1 and decreased VGAT levels in the hippocampus. However, no alterations in the expression of PSD95 were found. Finally, UPLC-MS-MS analysis detected nicotine and cotinine in the plasma of exposed mice.
Conclusion: Our work provides evidence about the association between neurobehaviors changes and alterations in VGLUT1 and VGAT levels in mice exposed chronically to e-cigarette vapors-containing nicotine. This study further our understanding about the link between synaptic dysfunction and nicotine exposure.

Others

Abstract Code: 121

In-situ localization of zorifertinib and its metabolites in liver and kidney rat tissues: bioactivation pathway elucidation of its reactive metabolites

Student(s) Name: *Nasser Salem Ahmed Alshakliah*
Supervisor(s) Name: *Adnan Ahmed Kadi, and Haitham AlRabiah*

Abstract:
Background: Zorifertinib (ZFB) is a novel, potent, oral, small molecule tyrosine kinase inhibitor used to treat non-small cell lung cancer (NSCLC). Matrix-assisted laser desorption ionization (MALDI) connected to Orbitrap XL MS has been applied to the *in-situ* analysis of the molecular composition of biological tissue sections. MALDI-MS imaging analysis was used for direct identification and detection of the ZFB and its metabolites simultaneously on the tissues of rat organs. Also, MALDI MS was used for *in-vitro* and reactive metabolites screening in spots of RLMs incubation with ZFB alone or in the presence of KCN or GSH.
Methods: The ZFB oral daily dose was 10 mg/kg for rat. Rats were sacrificed using halothane inhalation 3.5 hr after ZFB administration, kidney and liver were collected and immediately submersed in liquid nitrogen. Organ tissues (20µm) were prepared using cryostat microtome. RLMs metabolic incubation with ZFB were performed in the presence of GSH (1.0 mM) or KCN (1.0 mM).
Results: The ZFB, M1 and M2 were detected in the liver. The M1 and M3 were detected in the kidney. Three cyanide adducts, and three GSH conjugates were characterized.
Conclusions: In summary, MALDI Orbitrap XL was used for the identification and the spatial localization of ZFB and its metabolites in rat organs. Six reactive intermediates were detected and the mechanisms of the bioactivation mechanism was proposed. The generation of these reactive intermediates in ZFB metabolism illuminates the way for better understanding the reasons behind ZFB toxic side effects.

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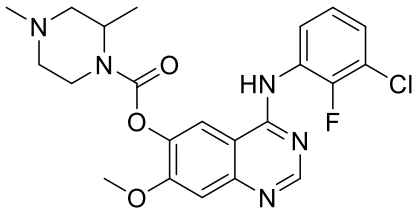

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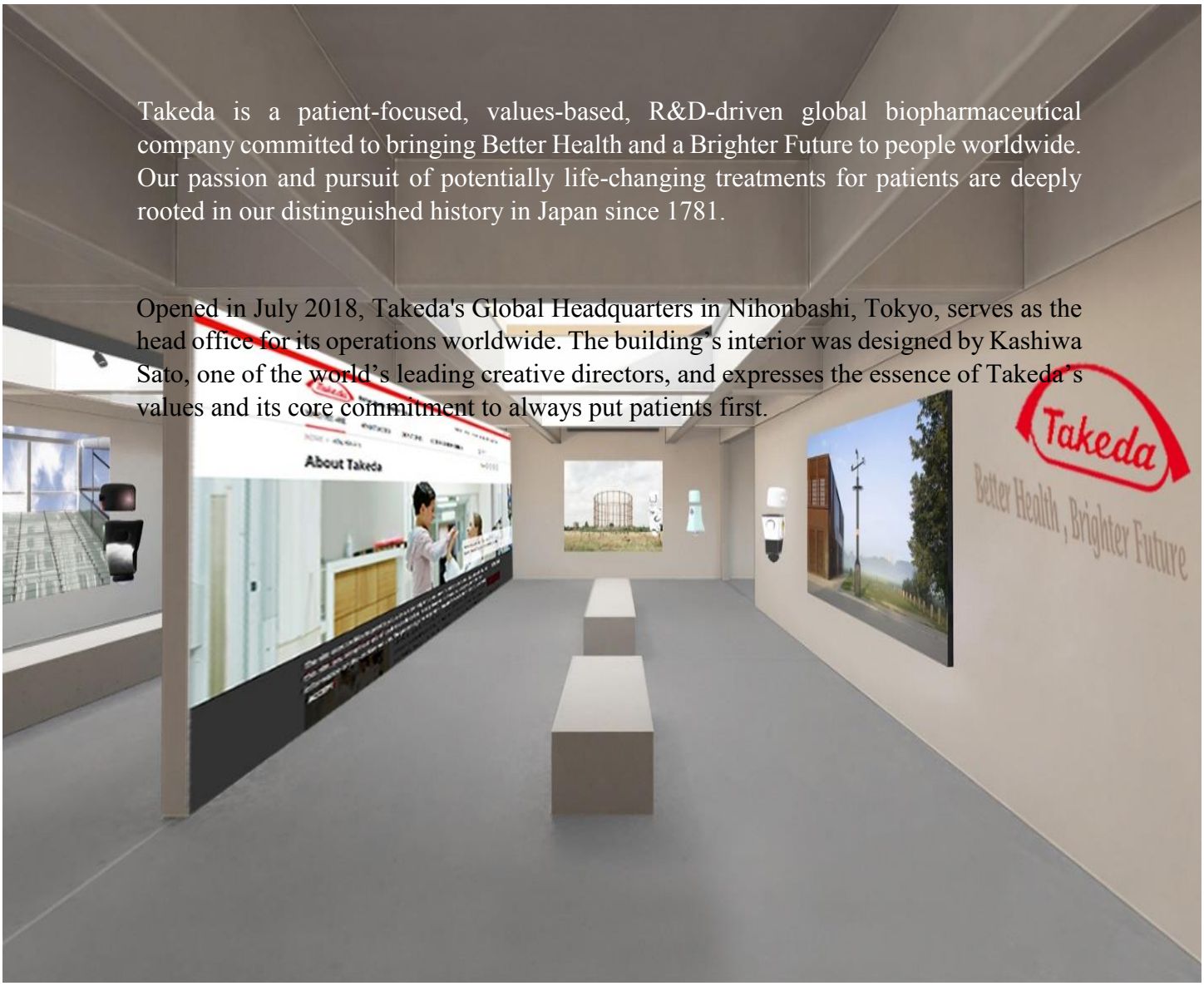

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