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The Pharmacist as a Public Health Provider

Abstracts Booklet

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Doctor of Pharmacy Program (PharmD): New Horizon for Pharmacy Education & Practice

Prof. Mohamed Moustafa (Egypt) - Plenary Talk

Today's pharmacists understand that pharmacy practice has changed over time to encompass not only preparation and dispensing of medication but also interacting with patients through interviews, information gathering, education, verbal and written communication, and patient counseling, along with approved successful communication and collaboration with other healthcare providers through the provision of pharmaceutical care. The practice philosophy of pharmaceutical care has led to development in pharmacy education from program leading to bachelor's degree in pharmacy to PharmD program, as well as the evolution of standards, legislations and laws that enable pharmacists to play a more significant role in the healthcare system.

Rational Drug Design Towards Sustainability

Dr. Nohad A AlOmari (Iraq) - Plenary Talk

As the demand for effective drugs has increased in the last century, a rational drug design has begun to replace old method. With the progress in the field of chemistry, biology, biochemistry, pharmacology, physics and increase in computational power, drug discovery has become inter disciplinary area and entered a new phase called computer aided drug design (CADD) or computer assisted molecular design (CAMD) (Latosińska and Latosińska 2013). This presentation will recap of key points: Emphasis on the importance of adopting sustainable practices in drug development. Also, call to action for the industry to prioritize sustainability.

Assessment of Drug Supply Management and its Quality Assurance Practice in Primary Healthcare Centers in Tripoli – Libya

Prof. Amal Benkorah (Tripoli-Libya) - Oral Presentation

Background: Drug supply management is a crucial aspect of ensuring efficient and effective health care delivery in Primary Health Care (PHC) centers. It encompasses the entire process of selecting, procuring, storing, distributing, and use of medicines. Poor drug supply management in health care settings, particularly in PHC centers, leads to negative consequences including shortages of essential medicines, low quality, theft, expiration of medicines, potential non-compliance to storage conditions and management, and incorrect use of medicines. Even though Libya's medicines supply chain has several problems, there are limited studies that have been conducted to help assess these issues. **Method:** A cross-sectional observational study, using a structured questionnaire and observational checklists, was conducted across 30 PHC centers in Greater Tripoli, Libya during the period of May to September of 2023. The collected data were statistically analysed using SPSS. **Results:** All PHC centers reported critical shortages of essential medicines (e.g. Paracetamol 90%) and overstocking of other medications (e.g. Losartan 53%), despite attributing quantification responsibility to the Tripoli Health Services Administration. Manual record-keeping and stock management resulted in poor documentation, hindering efficient inventory control in the visited centers. A critical basic reordering skills gap was identified among drug supply managers, with 70% were lacking training, and a further 57% demonstrating a lack of awareness regarding medicines supply management concepts. No Standard Operating Procedures (SOPs) were available at any of the visited centers. While two centers possessed dedicated vehicles, none of the others had a facility vehicle for transporting medicines. Stock cards were not utilized in any of the centers except one, and it was observed that there were several non-compliance items with regards to drug storage conditions, in addition to a poor storage management system. Pharmacovigilance programs were absent in an overwhelming 87% of the PHC centers, and a concerning 37% did not submit any types of reports at all. Despite regular supervision visits from higher-level authorities to all PHC centers, the need to implement the required reforms remains a pressing issue. **Conclusion:** Drug supply management in Libya faces several challenges. PHC centers therefore should prioritize the management of drug supply practices in collaboration with higher-level authorities so that they can ensure patient safety, optimize resource allocation, and contribute to improving public health outcomes within the country.

Incidence of cardiomyopathy in post – Covid-19 patients with perspectives on its management. A cross-sectional multi-center prospective and partially retrospective study in Tripoli-Libya

Dr. Ali Nasruddin Aldureedi (Tripoli-Libya) – Oral Presentation

Objectives: To get an overview on the prevalence of the disease among post-COVID-19 exposed patients in two isolation centers in the capital Tripoli, Libya and to evaluate the management policies followed at domestic hospitals. **Methods:** Detailed surveillance for 645 patients with cardiomyopathies (CM) was conducted by using a physician-based questionnaire from two isolation centers at Tripoli. The sole cardiac complication investigated in this study was CM. **Results:** The most age group affected by the virus and hence DCM was between 40-60 years old by 68%. Evaluating the use of medications in the treatment policy at both centers engaged in the study, there was a statistically significant variation in the use of medicaments compared to international guidelines. **Conclusion:** The most common cardiomyopathy seen in patients enrolled in this study was dilated cardiomyopathy. The most predisposing risk factors for worsening CM are hypertension and DM. despite of the complexity in treating these complications, clinical pharmacotherapies or clinical pharmacists are more valuable and thus, highly recommended. The use of diuretics was of concern since furosemide (Lasix ®) is widely used instead as the more recommended aldosterone antagonists. When following international guidelines, the use of ACE inhibitors was much more advisable where at domestic level ARBs are more used. **Keywords:** Dilated cardiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy, post COVID-19, cardiomyopathy medication.

Pharmaceutical Evaluation and Microbiological Properties of Three Brands of Tobramycin Eye Drops Marketed in Retail Pharmacies of Albayda, Libya

Dr. Samia Alsawi Majeed (Albayda-Libya) – Oral Presentation

Background: Tobramycin (TBM) is a water-soluble aminoglycoside antibiotic available in various pharmaceutical forms, including ophthalmic solutions. These are effective against a broad spectrum of ocular pathogens. Considering the importance of tobramycin eye drops for ocular infection treatment, it is crucial to evaluate the quality of these products. Such assessments are necessary to prevent the circulation of subpar eye drops that may endanger patient health and to control the spread of inferior-quality eye drops in Libya's pharmaceutical market. **Objective:** This study aimed to determine the pharmaceutical and microbiological efficiencies of three brands of tobramycin eye drops sold in retail pharmacies in Al-Bayda, Libya. **Methods:** Three sterile eye drops of three different brands of tobramycin obtained from the local Al-Bayda market in Libya were examined. The physical appearance of various brands was evaluated to assess the integrity of packaging and closure systems. In addition to Pharmaceutical analysis (color and clarity evaluation, pH, refractive index), sterility testing, antibacterial activity, and antimicrobial effectiveness were conducted by inoculating each differentiating nutrient medium (nutrient agar and Sabouraud dextrose medium) with different eye drop brands. **Results:** The findings indicated that all brand packaging met proper sealing standards with an intact container closure system. Labels passed FIP guidelines for prescribed medicine labeling. All brands were found to be transparent, free of particles when examined against white and black backgrounds. The pH values were determined to be 6.88, 6.91, and 6.90 for brands A, B, and C respectively, aligning with the physiological pH of tear fluid. The refractive indices of the three eye drop brands were measured at 1.335, 1.334, and 1.334 for brands A, B, and C respectively, which is consistent with that of tear fluid. Sterility tests revealed no microbial growth, and the preservatives were effective against Escherichia coli, Staphylococcus aureus, and Candida albicans. The preservative system confers resistance to microbial contamination during utilization. Further clinical investigations are necessary to evaluate these pharmaceutical agents' long-term efficacy and safety. **Keywords:** Tobramycin, eye drop, particulate matter, refractive index measurement, pH measurement, sterility test, antibacterial activity assessment, antimicrobial effectiveness of the preservative.

مواكبة التقنيات الحديثة في تطوير التعليم الصيدلي: رؤي مستقبلية للمهنة

أ.د حنان أبوشويرب (طرابلس-ليبيا) – عرض مرئي

تلعب مهنة الصيدلة دورًا حيويًا في الرعاية الصحية والمجتمع بشكل عام حيث يعد الصيدلاني هو الشخص الاكثر خبرة بالدواء واستخداماته وجزء مهم من فريق الرعاية الصحية. لذا فإن خلق صيدلي محترف ومتمكن هو الهدف الاول من أجل استخدام اقتصادي وأمن للدواء بما يساهم في تحسين الرعاية الصحية سواء بتطوير التعليم الصيدلي او تحديث المناهج الدراسية توفير التدريب العملي واستخدام التعليم الإلكتروني وتشجيع البحث العلمي الي تقديم برامج للتطوير المهني المستمر وتعزيز الشراكات مع الصناعة واستخدام التكنولوجيا الحديثة في التعليم الصيدلي: كالصيدليات الذكية مع استخدام الروبوتات الي أنظمة الوصفات الإلكترونية. ومن هنا يأتي أهمية تطوير الصيدلي لنفسه لتحسين جودة الرعاية الصحية وزيادة الكفاءة ومواكبة التطورات لتعزيز الثقة بالنفس ليكون مستقبل مهنة الصيدلة أكثر اشراقا من واقع المهنة اليوم.

Co-prescribing of probiotics and antibiotics against Entero-pathogenic bacteria

Dr. Raja M. Moman (Tripoli-Libya) – Oral Presentation

Probiotics defined as living microbes, or as food ingredients containing living microbes, that beneficially influence the health of the host when used in adequate numbers. Antibiotics are a type of antimicrobial drugs produced by a microorganism that kills or inhibits the growth of another microorganism used in the treatment and prevention of bacterial infections. Some of our pharmacist colleagues noted that almost all the probiotic prescriptions they receive in their pharmacies are co-prescribed with antibiotics and they asked many questions about if the antibiotics will affect the benefits of probiotics or vice versa and we noted a lack of knowledge about probiotics. The aim of this study was to investigate the frequencies of co-prescribing of probiotics and antibiotics against Entero-pathogenic bacteria as a combination therapy and pharmacists in Tripoli city, Libya understanding of the role of using probiotics and antibiotics co administration. The study carried on in February 2020 – August 2020 (During Covid-19 outbreak). Divided into two parts; firstly, meta-analysis regarding reports related to the effect of probiotics and antibiotics against enteropathogenic bacteria as a concomitant therapy. Secondly, a questionnaire targeted a group of pharmacists who are working at pharmacies in different places in Tripoli city to find out their knowledge about probiotics and their use, because they're the most health care professionals who are interacting with public and asked for medical advice with or without prescription regarding this issue. Observed articles were (20) and the average length of studies was around 3 weeks to 6 months. The most used probiotics were Lactobacillus, Bifidobacteria, and Saccharomyces. Commonly co-prescribed antibiotics were Flagyl and Augmentin. Regarding antibiotics and probiotics co-prescribing there was evidence that antibiotics damage the gut bacteria and administration of probiotics will lead to effective colonization of the gut. Still, this colonization delayed the normal recovery of microbiota for about 6 months. In the absence of probiotics, the microbiota returns to normal within 3 weeks of discontinuing the antibiotics intake. Conversely, investigations showed that taking probiotics can significantly decrease the incidence of antibiotics-associated diarrhea by about 50%. Distributed questionnaires were 100 (the number of participants was 52%). The Questionnaires were distributed randomly in different pharmacies in various areas of the city. From our study we conclude that most of the pharmacists included are not familiar with probiotics (95%) with the mistake of confusion with

oral rehydration salts (ORS); probiotics in prescriptions are always prescribed with antibiotics (in most cases Flagyl). In our data probiotics were prescribed as probiotic-only medicine (POM) and OTC (95%). However, there were solo prescriptions of probiotics among pharmacies included in the study. In most cases, probiotics are prescribed for kids <5 years old. The common duration of use was 3 days (76%). The participants (100%) reported that there were no complications of probiotics use and ~40% dispensed prescriptions that contained Probiotics daily. According to the questionnaire results we strongly recommend giving awareness lectures about probiotics and their health benefits targeting all health professionals in Libya as we noticed a lack of familiarity, understanding, and occasionally confusion about its mode of action. We hope to start adding this topic in medical faculties (Medicine, Pharmacy and Dentistry) programs of study due to its benefits to our health. Key words: Probiotics, antibiotics, co-prescription, Pharmacists and Diarrhea.

Determination of Some Heavy Metals and Phytochemical Analyses of Teucrium polium (Lamiaceae) Plant Used as Traditional Drug

Dr. Noor alhouda Hossam Aboshawesh (Benghazi-Libya) – Oral Presentation

Despite advances in medical science, Libya, like many other nations, maintains a health system that incorporates complementary and alternative medicine. Heavy metals and phytochemicals were investigated in Teucrium polium. Plants produce a wide variety of chemicals referred to as secondary metabolites, or phytocompounds, which collect in different parts of their bodies and are potential sources of new drugs such as phenolic compounds, steroids, coumarins, alkaloids, and flavonoids. The level of heavy metals were analyzed by using Flame Atomic Absorption Spectrophotometry (FAAS), while qualitative analyses were used to find the presence of phenolic, gelatin, terpenoids, tannin, steroids, and saponin. The results of the study indicated that heavy metals in T.polium were detected in the medicinal herb that was examined in tea extract including iron, nickel, copper, zinc, and cadmium while the heavy metals in T.polium acid digest extract including iron, copper, zinc, nickel, manganese, cadmium and chromium. In addition to that the results obtained in the present study show that the phytochemical concentration in T.polium terpenoids and phenolic are found in higher concentrations, tannin, gelatin, and steroids are present in medium amounts while saponin is found in low amounts. Due to its high concentration of phytochemical compounds, T.polium L is thought to have greater medicinal value than synthetic drugs with side effects.

Skin Bleaching and Its Associated Factors among Female Students of Bossaso University-Growe City, Somalia, 2024

Dr. Ismail Adam Arbab (Faculty of Pharmacy-LIMU) – Oral Presentation

Background: Skin bleaching (SB) is considered a serious public health issue affecting both white and dark-skinned people. Data on SB among university students in Somalia, in general, are rare, and no documented studies exist in the Garowe City of Puntland State in particular. The aim of this study is to document the prevalence and associated factors for using SL products among university students. **Methods:** A cross-sectional study was conducted involving three hundred and twenty-two female students at the University of Bosaso, Garowe City campus, who were selected using a systematic random sampling technique and included in this study. To collect data, a structured questionnaire and basic information on sociodemographic characteristics, knowledge, attitude, associated factors, brand of skin care products used, and reasons for use were sought. Other associated biological and environmental factors were also used. Data was analysed using SPSS 20.0. The statistical significance was stated at the p-value. **Results:** A total of 322 female students completed a pre-tested questionnaire. The mean age was 23 ± 3.3 years. Most of the respondents were aged 21–24 years (36.3%). Self-reported use of skin bleaching products was 95.3%, with the majority (67.1%) using more than two skin bleaching products. A friend mostly recommended Skin lightening products. Reasons attributed to skin bleaching included enhanced beauty and healthy skin (97.3%), higher social class (27.7%), and treatment of skin disorders (24.1%). The majority of the respondents (69.8% and 60.5%) said the skin bleaching products are obtained from cosmetic shops and open markets, respectively. **Conclusion:** SL products are quite popular among Bosaso University students. Friendship is a strong motivating factor that contributes to SL practice. As a recommendation, education and awareness about skin bleaching issues and the importance of sunscreen use are necessary in our universities. To preserve the health of society, pharmaceutical companies that produce and distribute these drugs and cosmetic supplies, as well as pharmacies that deal directly with the community, should consider reducing harmful chemicals as much as possible to avoid the aggravation of skin health problems that often extend and affect the internal organs of the body. **Keywords:** Skin bleaching, Prevalence, affective chemicals, University of Bossaso, open market

The Effect of Cinacalcet on the Biochemical Profile and Clinical Outcome, in Secondary Hyperparathyroidism - Chronic Kidney Disease in Patients in Al-Mana General Hospitals in Kingdom of Saudi Arabia

Dr. Riad Mohammed Abdelrahman (Faculty of Pharmacy-LIMU) – Oral Presentation

Introduction: Chronic kidney disease (CKD) complications are one of the leading causes of mortality. Management of PTH, phosphorus, and calcium balance, are important in slowing or preventing the progression of sHPT and MBD and associated consequences. **Objective:** Our objective is to assess the effect of Cinacalcet add-on therapy compared to conventional therapy alone on the biochemical profile & clinical outcomes in CKD patients with (sHPT) who are receiving haemodialysis **Method:** A mixed retrospective-prospective cohort multicenter study has been conducted in three of Al-Mana General Hospitals-KSA between Dec.1st 2017 and Jan.31st 2020. **Results:** Of the 174 subjects analyzed, median age was 61 years, median follow-up was 12 months and median GFR (ml/min) was 9.84ml/min. The mean percentage change in iPTH was significant in the cinacalcet add-on group (-27.93 Vs -8.43, p-value: 0.004), especially in males and older patients (p-value: 0.01& 0.03 respectively). Cinacalcet was better in achieving a ≥30% reduction in iPTH (33/60 (55%) Vs 36/114 (32%), P=0.003) especially in males and older patients (p-value; 0.001 and 0.000 respectively). Cinacalcet was better in achieving iPTH levels ≤300 pg/ml (27/60 (45%) Vs. 32/114(28%) ,P=0.025) especially in males (p-value; 0.00). Median serum calcium increase was not significant (By 0.3 mg/dL in the cinacalcet and by 0.15 mg/dL in the control group.(p-value; 0.17).Median serum phosphorus decreased significantly by 0.95mg/dL in the cinacalcet group and 0.15mg/dL in the control group, (p-value; 0.009), males has shown significant reduction compared to females (p-value; 0.003). There was significant reduction in the frequency of incidence of the cardiovascular events -all and the first cardiovascular events in the cinacalcet add-on group (p= 0.02 & 0.005 respectively). There was a significant delay in the incidence of IHD/ Hospitalization for Unstable Angina/ MI in the cinacalcet group compared to the conventional therapy group (0.04). Cinacalcet add-on patients were 79% less in the incidence of the All-cause first hospitalization; HR 0.31((95% CI; (0.16 - 0.63), p-value; 0.001). No significant difference observed in the frequency of All-cause mortality or CV mortality between the two groups (p-value; 0.52& 0.87 respectively).”””””Also there is no significant difference in survival between the two groups regarding all-cause & CV mortality (p-value; 0.06, 0.11 respectively), and no significant reduction in the risk of all-cause & cardiovascular mortality (p-

value; 0.06, 0.12 respectively),but cinacalcet patients having HYT and DM2+HYT etiology has lower mortality; HR (HYT; HR 0.46 (0.21-1.00, p= 0.05, DM2+HYT; HR 0.42(0.2- 1.00), p=0.04). No significant difference in the frequency of incidence of bone fractures between the two groups (p-value 0.26). A trend towards protection against risk of fractures was seen in males & older patients (Gender; HR 0.22, 95% CI: (0.03 - 2.02), p-= 0.2, Age ranking; HR 0.53, 95% CI: (.014- 17.838), p-value 0.7). No significant difference in the incidence rate of hypocalcemia between the two groups (p-value 0. 37), but there was significant difference in the average No. of hypocalcemic events in the cinacalcet group (p-value 0.017). Cinacalcet significantly caused nausea & vomiting (p-value 0.000& 0.008 respectively). **Conclusion:** There is superior efficacy for the cinacalcet-based treatment algorithm in achieving most of the K/DOGI K/DIGO biochemical targets for patients with CKD-SHPT under HD in whom conventional therapy alone was no longer effective (especially in males & older patients) , cinacalcet is superior in reducing the cardiovascular events, namely; IHD/Unstable angina/MI (especially in males & older patients) . Cinacalcet is not effective in reducing the risk of all-cause & cardiovascular mortality, except in patients with HYT or HYT+DM2 etiology. Cinacalcet might increase the average No of hypocalcemic events, nausea and vomiting.

Metformin dosage and renal protection in type 2 diabetes mellitus impact on estimated glomerular filtration rate

Dr. Ghada Hadiia (Benghazi-Libya) – Oral Presentation

Introduction: Metformin is considered the first-line treatment as a monotherapy for patients with type 2 diabetes mellitus. Emerging evidence suggests that metformin may have a renoprotective role; therefore, understanding the impact of metformin dose and therapy duration on renal function may significantly improve renal outcomes in type 2 diabetes patients. **Aim:** This study aims to investigate the renoprotective effects of metformin by analyzing its dose-dependent impacts on the estimated glomerular filtration rate in patients with type 2 diabetes mellitus. **Methodology:** Retrospective cross-sectional study design was used from September 2022 to October 2023. Data from 302 type2 diabetes patients were collected from patient files at the Benghazi Diabetic Center and the Al Jabal Al-Akhdar Diabetic Center, including all with type 2 diabetes mellitus patients on varying doses of metformin. The collected data included age, gender, metformin dose, duration of metformin therapy, urea, and creatinine. Exclusion criteria included patients with significant comorbidities such as chronic kidney disease (other than diabetic nephropathy),liver disease, heart failure, or malignancy; those taking nephrotoxic medications; individuals with recent acute illnesses or surgical procedures; pregnant or lactating women; participants with inadequate medical records; and patients who were non-adherent to metformin therapy. **Result:** Survival analysis was conducted to evaluate the effect of different metformin doses on the estimated glomerular filtration rate. The study analyzed 302 diabetic patients, of whom 46.0% were male and 54.0% were female. The age was 58.3±11.9 years. The HbA1c was 7.7%±1.3%.The duration of diabetes was 11.4±8.1 years. The creatinine was 1.0±0.9 mg/dL, and the urea was 36.7±23.8 mg/dL. Data analysis revealed a statistically significant difference in survival distribution across the dose groups. **Conclusion:** Different metformin doses significantly impact the estimated glomerular filtration rate, suggesting that dosage plays a crucial role in maintaining renal function.

Hepato-Pancreatic Protective Effect of Green Tea in Alloxan Induced Diabetic Rat model: A Histological and Biochemical Study

Dr. Nahla Boshnaf (Benghazi-Libya) – Oral Presentation

Background: Diabetes Mellitus stands as a paramount public health concern, particularly in developed nations, posing severe complications when untreated. Currently, no hypoglycaemic agent or combination therapy offers a solution devoid of toxicity or adverse effects. Emerging evidence suggests that green tea derived from Camellia Sinensis may have beneficial effects on blood glucose control and insulin sensitivity. **Objective:** This study aims to explore the potential hypoglycaemic impact of green tea in Alloxan diabetic Sprague Dawley rats, juxtaposed with the effects of Glibenclamide. Additionally, we seek to examine the protective role of green tea on pancreatic and liver cells**. Methods:** Thirty-two male rats were divided into four groups: negative control (no intervention), positive control (diabetes induced by alloxan with no drug intervention), glibenclamide treated (diabetes induced by alloxan and treated with glibenclamide), and green tea treated (diabetes induced by alloxan and treated with green tea). Diabetes induction entailed intraperitoneal administration of Alloxan monohydrate at a dosage of 150mg/kg. After 48 hours oral tea supplementation commenced at a daily dosage of 3g/kg for a further 21 days, with comparisons drawn against oral Glibenclamide at 0.5mg/kg. At the end of the experiment, the overnight fasted rats were sacrificed by decapitation and blood glucose levels, liver function tests, and histopathological analysis of liver and pancreatic tissue were evaluated. **Results:** The blood glucose levels were significantly increased in the untreated Alloxan-induced diabetic group, reaching 165.7 ±11.319 mg/dl ($p < 0.001$) compared to the control normal group 91.75 ± 7.464 mg/dl. Administration of tea resulted in a significant decrease in blood glucose levels to 85.8 ±4.657 mg/dl ($p < 0.001$), a reduction comparable to that achieved with Glibenclamide treatment, where blood glucose decreased to 87.57 ±5.507 mg/dl ($p < 0.001$). The histopathological examination of Pancreas revealed significant damage to the islets of Langerhans in addition to reduced size, disruption, and pyknotic nuclei in diabetic control group's rats'. However, an increase in Langerhans islets with restored structure was seen in the histological study of the pancreatic cells from the Glibenclamide and green tea groups. Diabetic rats showed no hepatic morphological and biochemical changes. **Conclusion:** These results demonstrate that green tea exerts both blood glucose- lowering and pancreatic protective effects in the diabetic model. **Key word:** Diabetes Miletus, Green tea, Glibenclamide, Alloxan.

Investigation of the Effectiveness of Medicines Imported from Turkey in Benghazi: Customer Satisfaction and Quality Assessment

Dr. Aya Aljayar (Benghazi-Libya) – Oral Presentation

The effectiveness of medications used across all national healthcare facilities, is one of the most crucial considerations when assessing a health system. In general, the effectiveness of therapy and the quality of the medications utilized have an impact on the standard of healthcare, especially in developing countries such as Libya that depend on imported medicines from various sources. In this research, we seek to investigate the validity of the prevailing belief in the Libyan community in Benghazi/Libya regarding medicines imported from Turkey by conducting a survey to collect the opinion of the community, represented by physicians, nurses, clinical and community pharmacists, and patients. Followed by a thorough investigation of the quality of generic-branded medicines in comparison to their innovator formulations. The results show that all used batches of Atacand ® (candesartan cilexetil 16 mg) oral tablets met the specifications of the BP for the weight uniformity test, the friability test, and accepted time required for disintegration in distilled water medium. In contrast, we observed statistically significant variations in the content uniformity and in-vitro dissolution study within and between the batches produced in Turkey and those produced in Switzerland. In conclusion, all studied tablets of generic-branded samples of candesartan cilexetil 16 mg tablets exhibit variation from the innovator tablets. These results indicate the need to perform the required quality control tests on all imported medications as well as preventing drug smuggling that results in the presence of below value medications in the market. **Key words:** candesartan cilexetil, innovator, generic-branded, quality control test, in-vitro evaluation.

A Comparative Analysis of PharmD Program curricula in North America and selected Arab Countries

Dr. Abdulmottaleb Zetrini (Canada) - Plenary Talk

Introduction: The evolution of the pharmacy field has significantly transformed pharmacy education globally. The expanded role of pharmacists in the healthcare system has driven the introduction of the Doctor of Pharmacy (PharmD) program in the pharmacy schools across various countries. This program equips students with critical clinical knowledge, pharmacy practice, and patient care skills, preparing them to be patient-focused experts in the safe and effective use of medications. **Objective:** To evaluate the differences in the PharmD program curricula across various pharmacy schools in the United States, Canada, and selected Arab countries. **Methods:** This study involves a sample collection of the most recent curricula, course descriptions, and student handbooks of all the PharmD programs on the university's websites. The courses were classified into 3 clusters: 1) Pharmaceutics and Pharmaceutical Chemistry, 2) Biological Sciences, 3) Pharmacy Practice, Pharmaceutical Care, and Clinical Pharmacy. **Findings:** This study showed that all pharmacy school programs in the USA and Canada have transitioned into the PharmD program. In contrast, the adoption of the PharmD program in Arab countries has been slower, with many pharmacy schools still following the traditional Bachelor of Pharmacy program. In the USA and Canada, courses related to pharmaceutical care are offered to students from the first year of the program. While in the Arab countries these courses are taught at the end of the program. We also found a significant variation in the credit hours distribution among the three clusters between North America and the Arab countries. Most of the curricula in the USA and Canada are pharmaceutical care-focused courses. While some universities in the Arab countries such as Saudi Arabia, Egypt, Libya, Kuwait and Jordan implemented the PharmD programs, where more pharmaceutical care courses are added, their curricula are still more focused on introductory pharmaceutical sciences-related courses. **Conclusion:** The PharmD curricula of the pharmacy schools in the USA and Canada are similar. While some pharmacy schools in the Arab countries have replaced the traditional Bachelor of Pharmacy program with the PharmD program, the curricula still require improvements towards implementing more pharmaceutical care and patient centered care approaches and reducing the number of courses related to pharmaceutical sciences.

Shaping the Future: Modern Pharmacy Education for a Dynamic Healthcare Landscape

Dr. Mohamed Baraka (UAE-Online) - Plenary Talk

The evolving healthcare landscape, characterized by technological advancements, personalized medicine, and the increasing complexity of patient needs, demands a new approach to pharmacy education. Preparing pharmacists to thrive in this dynamic environment requires rethinking traditional curricula and embracing modern educational strategies. This presentation explores the essential reforms needed to future-proof pharmacy graduates, equipping them with skills that extend beyond traditional drug knowledge and into patient-centered care, digital health, and interdisciplinary collaboration. Central to this transformation is the integration of cutting-edge technologies such as simulation, artificial intelligence, and telehealth into pharmacy education, fostering critical thinking and problem-solving abilities in real-world clinical contexts. Moreover, experiential learning and interprofessional education are vital to bridging the gap between theoretical knowledge and practical application, ensuring that future pharmacists can effectively contribute to diverse healthcare teams. These strategies align with the global push for healthcare professionals to be adaptable, digitally competent, and innovative, particularly as emphasized by international bodies like the International Pharmaceutical Federation (FIP) and reflected in successful curriculum models globally. This presentation will highlight key curriculum transformation initiatives that incorporate patient-centered care, interdisciplinary training, and lifelong learning. It also discusses challenges in integrating these changes into overcrowded curricula and the strategies employed by institutions to overcome barriers. Ultimately, the goal is to foster a new generation of pharmacists capable of meeting the healthcare challenges of tomorrow with confidence, adaptability, and advanced clinical skills.

Remodeling Tumor Immune Microenvironment by Using Polymer-Lipid-Manganese Dioxide Nanoparticles with Radiation Therapy to Boost Immune Response of Castration-Resistant Prostate Cancer

Dr. Abdulmottaleb Zetrini (Canada) – Oral Presentation

Despite substantial progress in the treatment of castration-resistant prostate cancer (CRPC), including radiation therapy and immunotherapy alone or in combination, the response to treatment remains poor due to the hypoxic and immunosuppressive nature of the tumor microenvironment. Herein, we exploited the bioreactivity of novel polymer–lipid manganese dioxide nanoparticles (PLMDs) to remodel the tumor immune microenvironment (TIME) by increasing the local oxygen levels and extracellular pH and enhancing radiation-induced immunogenic cell death. This study demonstrated that PLMD treatment sensitized hypoxic human and murine CRPC cells to radiation, significantly increasing radiation-induced DNA double-strand breaks and ultimately cell death, which enhanced the secretion of damage- associated molecular patterns, attributable to the induction of autophagy and endoplasmic reticulum stress. Reoxygenation via PLMDs also polarized hypoxic murine RAW264.7 macrophages toward the M1 phenotype, enhancing tumor necrosis factor alpha release, and thus reducing the viability of murine CRPC TRAMP-C2 cells. In a syngeneic TRAMP-C2 tumor model, intravenous injection of PLMDs suppressed, while radiation alone enhanced recruitment of regulatory T cells and myeloid-derived suppressor cells. Pretreatment with PLMDs followed by radiation down-regulated programmed death-ligand 1 and promoted the infiltration of antitumor CD8+ T cells and M1 macrophages to tumor sites. Taken together, TIME modulation by PLMDs plus radiation profoundly delayed tumor growth and prolonged median survival compared with radiation alone. These results suggest that PLMDs plus radiation is a promising treatment modality for improving therapeutic efficacy in radioresistant and immunosuppressive solid tumors.

Comprehensive Nutritional Management to Optimize SGLT-2 Inhibitor Therapy: Preliminary Findings from an Ongoing Systematic Review and Meta-Analysis

Dr. Saddam Abdelazim (Egypt) – Oral Presentation

Background: SGLT-2 inhibitors have transformed type 2 diabetes management. However, their optimal use may require tailored nutritional strategies to enhance benefits and mitigate risks. **Objective:** To present preliminary findings from an ongoing systematic review and meta-analysis investigating the impact of comprehensive nutritional management on SGLT-2 inhibitor therapy outcomes. **Methods:** We are conducting a systematic review of studies from 2010-2024, focusing on RCTs and large observational studies. Databases searched include PubMed, Cochrane Library, and Embase. We are developing an integrated care model combining pharmacological and nutritional management approaches. **Preliminary Results:** Early findings suggest that SGLT-2 inhibitors offer benefits beyond glycemic control, including potential improvements in cardiovascular and renal outcomes. We have identified several areas where targeted nutritional interventions might enhance efficacy and mitigate risks, such as volume depletion, electrolyte imbalances, and bone health. Our emerging 'Nutritional Wheel' concept aims to provide a framework for optimizing treatment outcomes. **Interim Conclusion:** While our systematic review and meta-analysis are still in progress, initial results indicate that an integrated approach combining SGLT-2 inhibitor therapy with comprehensive nutritional management may offer promising avenues for improving patient outcomes. This ongoing research underscores the potential role of pharmacists in providing holistic care that encompasses both medication management and nutritional support for patients with type 2 diabetes. **Keywords:** SGLT-2 inhibitors, Type 2 diabetes, Nutritional management, Integrated care, Pharmacist role.

Preparation and Evaluation of Beeswax Microparticles Loaded with Rifampicin for Sustained Effect

Dr. Yousra G. Bahron (Tripoli-Libya) – Oral Presentation

Mycobacterium tuberculosis is a serious public health problem, and its treatment involves prolonged oral administration of combined antibiotics, which are associated with unwanted side effects and poor patient compliance. A polymeric drug delivery system in the form of microparticles was developed to sustain the release of the model drug, Rifampicin, for the ideal treatment of tuberculosis. The microparticles were obtained by using a meltable dispersion and cooling method. Beeswax was used as a release controlling polymer in different ratios and other copolymers (CA and PVP) were included in an attempt to enhance the efficiency of the formulated microparticles. The microparticles were physico-chemically characterized in terms of micromeritic properties, drug content, drug polymer compatibility, and antimicrobial capability. In vitro drug release and the effect of inclusion of the copolymers on the drug release have been investigated. The obtained microparticles were discrete granules with free flowing and good compressibility. The yield of these granules was up to 98.9%, with drug content ranged from 65.1-112.9%. FTIR study confirmed that there was no interaction between the drug and the added polymers. The antimicrobial study proved that the granules had antibacterial ability as strong as free drug. In vitro release studies revealed that the drug release was sustained for more than 6 hours, depending on the beeswax concentration, while the inclusion of the copolymers didn't have statistically significant effect on drug release from these granules. The release pattern has been fitted into various kinetic models with minimum possibility for the application of zero-order model. **Key words:** Rifampicin, microparticles, beeswax, sustained release.

The Pattern of dispensing antibiotics for inpatient in Benghazi's hospitals

Dr. Makpula. A. Altarhuni (Benghazi-Libya) – Oral Presentation

Purpose: The principal risk factors for the development of antibiotic resistance are the excessive and misuse of antibiotics. The insufficiency of professional proficiency among medical care practitioners and in the absence of the guidelines of using the antibiotics inside Benghazi's hospitals, could potentially aggravate these challenges within the hospitals in Benghazi. This study aims to document the clinical pattern of antibiotics use and its overuse and misuse rates in the medical care institutions and to evaluate the association between antibiotics use and the Professionals within Benghazi's hospitals. **Methods:** A cross-sectional questionnaire-based survey, prospective study from July 2 to November 20, 2019 used among professionals of Benghazi's hospitals. The data was completed by professionals from four hospitals in Benghazi. These hospitals are regarded as key providers of healthcare services to the eastern region of Libya. **Results:** A total of 122 health care professionals responded to this study, professionals which are from various practice fields participated in the survey but the majority were nurse (52.2% n= 64), also Clinical pharmacists (35.2% n=43), while only (12.3%, n=15) ware nurse. The majority of participants (58.2% n=71) of the professionals surveyed indicated non-compliance with the antibiotic prescribing protocols within the hospital. (63.9% n=71) of the participants agreed against obtaining a sample from the infectious patient upon admission to the hospital. (80.3% n=98) of the participants concurred that there was a delay or withholding of the necessary antibiotic dose from the patient. **Conclusion**: In conclusion, the majority of surveyed professionals exhibited non-compliance with the hospital's antibiotic prescribing protocol. Furthermore, the absence of a clear guideline for antibiotic dispensing in the hospital is coupled with a lack of commitment to administering the prescribed antibiotics to patients at the designated times within the hospital.

Reduction of Anti-HER2 Resistance in Breast Cancer by Eliminating the Steric Clashes at the Orthosteric Site in Mutant HER2^{T798I}

Dr. Wafa. M. Makhlof (Benghazi-Libya) – Oral Presentation

Background: Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body.(Brown et al., 2023) Cancer interrupts normal bodily functions and causes pain, organ failure, and syndromes such as cachexia. It also spreads quickly and uses resources and produces metabolites, disrupts tissue, and coopts normal noncancerous cells. (Law, 2022) **Objective:** investigate the reduction of anti-her2 resistance in breast cancer by eliminating the steric clashes at the orthostatic site in mutant her2^{t798i}. **Methods:** Computational methodologies and modeling software was used to generate data and guide decisions in designing different flexible lapatinib analogs to avoid the steric clashes generated at the binding site by using maestro software to prepare and dock for ligand and protein. The next step is to assign pose ligand by Molecular Dynamics (MD) Simulations, and monitoring pharmacokinetics by Swiss ADME. **Results and conclusion:** It was concluded that among the screened compounds, ten compounds showed better docking scores compared to the reference drug. Compound **856174** (Docking Score -9.921 kcal/mol). H-bonds with the receptor residues of THR 862 and methionine 801(98%), LEU 753 and SER 783(50%) by water bridge and hydrophobic bonds. In addition to hydrophobic bonds with LEU 726, ALA 751, LEU 785 along with favorable physicochemical properties, such as moderate solubility, molecular weight of less than 500 Da, and TPSA of 99.37. Furthermore, this candidate compound exhibited lower hepato- toxicity (inactive), had an average number of rotatable bonds 8, LD50 10000 mg/kg, lead likeness 3, PAINS 0 and high GI absorption, with no BBB penetration, H bound accept 7 with 1 donor, clog p 3.29 and stable in protein.

Perception and Attitude of Libyan Community Pharmacists towards Ethical Issues Encountered During Pharmacy Practice

Dr. Heba Soliman Alaroshe (Benghazi-Libya) – Oral Presentation

Background: Community pharmacists are challenged during their daily practice with ethical issues that influence their decision-making. **Objective:** The present study aims to explore the common ethical issues facing community pharmacists and impacting their decision-making. **Methods:** A cross-sectional qualitative questionnaire-based study was conducted using a pre-piloted previously used survey with scenarios of ethical issues posted on the internet, and participants had to select a response on a 3-Lickert scale with "agree, neutral, or disagree. **Results:** In general, the findings of the present study are comparable to those of earlier literature, where responses of community pharmacists in dealing with ethical issues during their daily practice were not always based on solid ethical standards. **Conclusion:** Results of the present study indicated a need for a national code of ethics for pharmacists. There is also an urgent need to develop/enhance courses on ethics in pharmacy curricula and develop continuing pharmacy educational programs stressing mainly on professional ethics.

Accuracy of Paediatric Oral Liquid Measuring Devices in Libya: Comparison of Dosing Cups, syringes and household Spoons

Dr. Zamzam Elmahdi Burkan (Sabha-Libya) – Oral Presentation

Background: Our goal was to examine the following volunteer's women to the use of liquid medications measuring devices: (1) which liquid medication dosing devices are commonly owned and used; (2) the ability of participants to accurately measure liquids using different dosing devices; (3) their ability to correctly interpret a variety of dosing instructions. **Methods:** Three hundred and thirty volunteer's women were interviewed. Participants were shown 3 liquid dosing devices and were asked which they had in their home and which they had ever used; they asked to bring some spoons which usually they used at their home as liquid measuring tools. The participants were tested on their ability to measure liquid medicines accurately or not**. Results**: A total of 100 subjects completed the study. They measure with the dosing cup, hypodermic syringe and their teaspoons which was brought with them. Women with more education had better results. Common errors included confusing teaspoon, dessert spoon and tablespoons. For a medicine cup, the thought was one full cup is one unit dose and misreading a dosage chart. Also the thought that half of the tablespoon was equal to one teaspoon, their spoons were variable in size, shape and give variable wrong measuring, they cannot recognise between dessert spoon and teaspoon. Majority of them (70%) believed that the cup and the spoon was easy to use and (20%) believed that the syringe was easy and accurate and (10%) say that syringe was the accurate but not easy for some children who had been injected with a hypodermic syringe before. **Conclusions:** spoons were the most commonly used devices at home for measuring liquid medications. Subjects were more likely measure an unacceptable dose with their spoons when compared with a dosing cup and hypodermic syringe. However, a large proportion of study participants were unable to measure an accurate dose with either device. They should encourage the use of more accurate devices, particularly the oral dosing syringe and medical measuring cups. Community pharmacists should educate parents on the selection and proper use of measuring devices to improve the accuracy of medication administration to their children. **Key Words:** Measuring devices; Medication administration; Medication errors, Parent education; Paediatrics.

Spectrophotometric Studies on the Determination of Tenoxicam in Pharmaceutical Formulations via Complexation with Thorium (IV)

Dr. Aisha Kashbour (Benghazi-Libya) – Oral Presenttaion

A new simple spectrophotometric method has been developed and optimized for the determination of tenoxicam in different pharmaceutical preparations based on the complexation reaction of tenoxicam with thorium (VI) ion. The method depends on tenoxicam chelation with thorium (VI) ion, resulting in a pale-yellow complex that reaches its maximum absorption at 374nm. In the concentration range of 2.5–30 mg/l, Beer's law is followed within the correlation coefficient of >/=0.9667 (n=6). The effects of varying organic solvents and pH levels, temperature, time, and common excipients on complexed tenoxicam absorbance have also been investigated. With the optimized testing settings, the assay was effective in identifying tenoxicam in tablets, and suppositories. The method was validated statically; reliability and linearity were studied as well.
Keywords: Pharmaceutical formulations, Tenoxicam, Spectrophotometer, complexes, Thorium (IV).

An Investigation into the Feasibility of Shifting the Maximum UV Absorbance of Diclofenac to Higher Wavelengths

Dr. Ahmed Khaled (Benghazi-Libya) – Oral Presenation

Some of the UV spectrophotometers available in the Libyan market have limited UV range in which the maximum absorbance of active pharmaceutical ingredients (APIs) can be measured. This makes it almost impossible to quantitatively detect the API in solution and as a result many dissolution studies might get terminated. Shifting the maximum UV absorbance of some APIs could be feasible via complexation. The aim of this project is to investigate the feasibility of inducing a bathochromic shift in the UV absorbance of diclofenac above 300 nm in order to study their dissolution using limited capabilities UV spectrophotometers. The potential complexation of two complexing agents, Bromocresol green and Copper sulphate, with diclofenac were investigated. It has been observed that Bromocresol seems to mask the main signal of Diclofenac at 295 nm while copper sulphate seems to interact with excipients in the I.V formulation of diclofenac. The latter can be further investigated if a pure diclofenac powder becomes available. This study can help scientists planning to conduct similar studies in the future design their experiments. **Keywords:** Diclofenac, Spectrophotometer, Ultraviolet (UV), Maximum absorption.

MDrug's Excipients: Their Purpose of use and Possible Health Effect in Different Form of Medication Dispense in the Drug market

Dr. Heba Elibrahim (Benghazi-Libya) – Oral Presentation

Backgrounds: Pharmaceutical excipients are basically everything other than the active pharmaceutical ingredient. Ideally, excipients should be inert, however, recent reports of adverse reactions have suggested otherwise. The aim of the present work was to determine the types of excipients present in drug formulation, known purpose of adding such pharmacological excipients and study the possible health effect. **Methods:** a cross section studies conducted in different drugs marketing for collecting systemic medication to find the types of excipients. The purpose of excipients present in the drug formulation and possible health effect were collected from the literatures on the PubMed, Google scholar and web of sciences **Results:** The data collected on numbers of drugs from different drugs marketing shown that, different company used different excipient even for the same generic name. Around28 Different excipients have been found in CNS drugs formulation, 24 in CVD drugs, 20 in GIT drugs, 4 in respiratory drugs, 14 in nephrological disease, 9 for blood medications, and oral anti-diabetic agents 14 excipients. The common excipients found in the drugs were Titanium Dioxide, Gelatin, Sugar spheres, sucrose, Hypromellose, acetate succinate, Talc, Triethyl citrate, sodium, calcium, Crospovidone and Magnesium stearate and etc. The purpose of excipients used were as Diluent, binder, Reduce inter-particular friction disintegrants, filler and color agents. Furthermore, the health of effect of such excipients include elevate blood pressure, and glucose, cardiac erythema, allergy, diarrhea **Conclusion:** The adverse effect of the excipients should not be underestimated and a periodic review and follow up of side effects that may appear and occur after a drug administration should not be limited to the active medication in the drug formula but also the excipient should be taken into account.

Harnessing AI for Enhanced Pharmaceutical Practice: An American Perspective on Global Health Impact

Dr. Huda Zatout (USA) – Plenary Talk

The integration of artificial intelligence (AI) into healthcare is revolutionizing the pharmaceutical industry by streamlining operations, improving patient outcomes, and supporting evidence-based decision-making. This presentation explores how AI, particularly through advanced natural language models like ChatGPT, is empowering pharmacists to become proactive advocates for community health. Drawing on recent experiences from the United States' leading healthcare performance improvement company, I will share practical insights on how AI is utilized in the U.S. to optimize pharmaceutical services, enhance clinical decision support, and improve resource allocation. This session will outline best practices for leveraging AI in routine tasks such as monitoring drug interactions, educating patients, and managing supply chains, while also discussing potential applications in healthcare settings in the Middle East and North Africa. Furthermore, we will explore the challenges and successes from a U.S. perspective ensuring participants gain a thorough understanding of AI's impact on patient care, professional development, and healthcare equity. Ultimately, the presentation aims to inspire pharmacists and healthcare leaders to embrace AI as a tool for advancing public health, closing gaps in care, and strengthening the role of pharmacists as community health advocates. This global approach will emphasize the need for cross-cultural collaborations and innovations that address the unique needs of diverse populations.