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ABSTRACT BOOK

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Index

The value of Computational Chemistry in Pharmaceutical Industries

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Computational chemistry in the pharmaceutical industry has expanded to become a discipline that actively contributes to various aspects of drug design, such as target selection and lead identification and optimization. The advancement of methodologies has played a pivotal role in this growth, while organizational advancements have also been critical to our achievements. Specifically, the interaction between computational and medicinal chemistry, as well as the integration of computational chemistry throughout the entire drug discovery process, have been invaluable. Many well-known pharma industries have established and cultivated a highly efficient computational chemistry group for the discovery of small-molecule drugs over the past decade, which has had a significant impact on the clinical development. Here, I will present an account of the configuration and responsibilities of the computational cluster. I will also elucidate the methodologies that have proven to be the most invaluable and effective, as well as discuss on forthcoming avenues for the enhancement of computational chemistry techniques

Novel Transethosomal Gel Containing Miconazole Nitrate; Development, Characterization, and Enhanced Antifungal Activity

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Miconazole nitrate (MCNR) is a BCS class II antifungal drug with poor water solubility. Although numerous attempts have been made to increase its solubility, formulation researchers struggle with this significant issue. Transethosomes are promising novel nanocarriers for improving the solubility and penetration of drugs that are inadequately soluble and permeable. Thus, the objective of this study was to develop MCNR-loaded transethosomal gel in order to enhance skin permeation and antifungal activity. MCNR-loaded transethosomes (MCNR-TEs) were generated using the thin film hydration method and evaluated for their zeta potential, particle size, polydispersity index, and entrapment efficiency (EE%). SEM, FTIR, and DSC analyses were also done to characterize the optimized formulation of MCNR-TEs (MT-8). The optimized formulation of MCNR-TEs was incorporated into a carbopol 934 gel base to form transethosomal gel (MNTG) that was subjected to ex vivo permeation and drug release studies. In vitro antifungal activity was carried out against *Candida albicans* through the cup plate technique. An in vivo skin irritation test was also performed on Wistar albino rats. MT-8 displayed smooth spherical transethosomal nanoparticles with the highest EE% (89.93 ± 1.32%), lowest particle size (139.3 ± 1.14 nm), polydispersity index (0.188 ± 0.05), and zeta potential (−18.1 ± 0.10 mV). The release profile of MT-8 displayed an initial burst followed by sustained release, and the release data were best fitted with the Korsmeyer-Peppas model. MCNR-loaded transethosomal gel was stable and showed a non-Newtonian flow. It was found that ex vivo drug permeation of MNTG was 48.76%, which was significantly higher than that of MNPG (plain gel) ($p \leq 0.05$) following a 24-h permeation study. The prepared MCNR transethosomal gel exhibited increased antifungal activity, and its safety was proven by the results of an in vivo skin irritation test. Therefore, the developed transethosomal gel can be a proficient drug delivery system via a topical route with enhanced antifungal activity and skin permeability

Means of implementing SDG-3 (Good Health and Well Being): A way forward for Pharmacy Institutes

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The release of the Times Higher Education Impact Rankings in 2019 encouraged universities to contribute to the achievement of the SDGs. It presents not only an overall evaluation, but also a ranking for each of the 17 goals of the SDGs. Through rankings, Universities' social contribution efforts are visualized and produced a sense of competition among universities. SDG-3 ensures healthy lives and promote well-being for all at all ages. The institutes of higher education have important roles to play in achieving SDG-3. The SDGs provide a platform for the educational institutions to give back to the community by exhibiting their desire and providing meaningful opportunities to develop their own country. Pharmacy Institutes have the ability to take the lead in achieving SDG-3 through various means for example: i) providing educational programs on SDG-3 and development of human resource, ii) by creating knowledge through research and disseminate it to society through imparting education, iii) cross-sectoral dialogues and partnerships, iv) advocating the importance of the SDG-3, v) collaboration for health and well-being of the society, vi) through community engagement vii) making campus smoke-free, viii) play a role in improving mental health of students, ix) integration of SDG-3 in the vision and mission of Pharmacy Institutes. By doing so, Pharmacy Institutes can strengthen health systems and foster resilience in the face of health adversities.

Development of Nutraceutical, prospects and challenges

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Because of their potential for therapeutic, safety, and nutritional benefits, nutraceuticals have attracted a lot of attention. Promising outcomes in a range of complications have been observed with these compounds in recent studies. It makes sense that people's attention is turning to proactive disease prevention in order to maintain their health. Nutraceuticals are widely consumed, but some are found to be tainted with heavy metals, and others lack the anticipated amounts of active ingredients. Supplements are generally unnecessary unless there are known deficiencies, and consuming too much of some nutrients can raise the risk of cancer. The use of nutraceuticals raises concerns about public health, which this study addresses. It also makes recommendations for how to develop scientific standards for health claims made by nutraceuticals, particularly in light of the growing global economy.

FenGin-D: A Novel Herbal Approach to Alleviate Dysmenorrhea

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Dysmenorrhea, characterized by lower abdominal pain preceding or during menstruation, remains a prevalent concern affecting the quality of life for many women. Traditional nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly prescribed for relief, yet their side effects, such as ulcer and arthritis, pose significant challenges. In response, "FenGin-D," is presented as an innovative herbal solution in the form of lozenges. FenGin-D uniquely incorporates fennel and ginger as its active ingredients, harnessing the analgesic properties of anethol in fennel and the in ginger. These herbal extracts are meticulously crafted into lozenges, ensuring direct absorption through the bloodstream, thereby enhancing bioavailability compared to conventional tablet forms. Preliminary trials involving women, conducted with their informed consent, have yielded promising results, showcasing the potential efficacy of FenGin-D in alleviating dysmenorrhea. Large-scale clinical trials are currently underway to further substantiate these initial findings. Moreover, FenGin-D distinguishes itself by offering a cost-effective alternative to existing market products, making it a more patient-compliant solution. As the development of herbal alternatives for dysmenorrhea is limited, FenGin-D fills a crucial gap, providing a safe and effective option for women seeking relief from menstrual pain without the associated side effects.

Temperature and Redox-Responsive Polymer Lipid Hybrid Nanocarriers Against Breast Cancer

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Cancer is defined as the uncontrolled division of the cells. In the past many years, there have been many studies that have considered various approaching for treatment of cancer. Breast cancer is considered to be the leading cause of cancer in women. The aim of this study is to design a temperature and redox responsive drug delivery system that delivers maximum amount of drugs into cancerous tissue without any unwanted premature leakage such that the drug can be effectively released at the target site. Hot melt encapsulation employed to formulate solid lipid nanoparticles containing 5-fluorouracil. SLNs were formulated using Lauric Acid, Oleic Acid, Ethanol, Span 80 and aqueous phase containing distilled water and Tween 80. Zeta analysis have confirmed the formation of the SLNs in nano range. The FTIR spectra of FTCS- SLN-5-FU confirmed the successful coating of FTCS around drug loaded SLNs**.** The SEM images of formulations have detected various nano-sized particles well-segregated from each other. Thermal analysis (DSC/TGA) has confirmed the stability of drug with other excipients and also confirmed the melting point of the selected TLM for the production of thermo-responsive DDS. *In-vitro* release studies have confirmed the redox and temperature sensitive behavior of the formulations (CS-SLN-5-FU, TCS-SLN-5-FU, FTCS-SLN-5-FU, and SLN-5-FU) at pH 5.8, 39°C and in the presence of glutathione, whereas *ex-vivo* permeation studies have revealed that the prepared formulations have shown an effective permeation from the rabbit intestinal membrane. *In-vivo* studies carried out presented a significant difference in hematological, LFTs, RFTs, disease marker and oxidative stress biomarkers in TC groups (FTCS-SLN-5-FU & SLN-5-FU) when compared with the DC group. Also the histoarchitecture of TC groups (FTCS-SLN-5-FU & SLN-5-FU) was comparable to that of NC group.

Formulation, Characterization, and Evaluation of β-cyclodextrin Functionalized Hypericin Loaded Nanocarriers

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St. John's wort, in western Europe have been extensively utilized for the treatment of mild to moderate depression. Hypericin, a red pigment, is found to be responsible for its anti-depressant activity. The aim of current study was to prepare a nanoemulsion (o/w) of hypericin designed for immediate delivery of the drug to the brain for the treatment of depression. Nanoemulsion was prepared by means of homogenization technique and that was followed by its physicochemical evaluation. Tween-80, Span-80, β-cyclodextrin, ethanol and eucalyptus oil were utilized for the manufacturing of nanoemulsion. Morphological studies have revealed globular structures of nano-size, that was confirmed by the zeta analysis. Consistency of particles was revealed by the low polydispersity values. pH values of all formulations lied within the range of nasal pH. Viscosity of the prepared formulations was affected by the increase in concentrations of β-cyclodextrin. After passing from the centrifugation and freeze thaw studies, the prepared formulations have shown a good stability. Formulation (F2) having composition of oil phase (0.125ml), aqueous phase (1.25ml) and β-cyclodextrin (8%), had shown better results out of all the formulations, F2 have pH of 5.7, 5.35 cP viscosity, 1.332 refractive index, 148.8 globule size and -10.8 zeta potential. Mean percentage drug release, *in-vitro* and *ex-vivo* percentage drug permeation was observed to be 71.75%, 76%, 75.07%, respectively. While, formulation (F2) had shown the maximum drug release and permeation. The *in-vivo* behavior studies including open field test, elevated plus maze test and tail suspension test were conducted to see the anti-depressant effect of hypericin along with comparison of commercially available treatment. In conclusion, the prepared show good efficacy as an anti-depressant and can be considered as natural alternative over synthetic drugs.

Evaluation of general public knowledge, attitude, and practice towards use of Over-the-Counter medication (self-medication) among medical and nonmedical students of The University of Lahore

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Over the counter(OTC) drugs are consider as safe and effective for use by the general public without seeking treatment by a health professional but for being called safe, they are misused to an extreme level which is an alarming situation for community health. This study aimed to evaluate knowledge, attitude, and practice towards OTC among medical and non-medical students. This cross-sectional study was conducted from December 2021 to March 2022 at University of Lahore. A structured and validated questionnaire was used to collect data. Moreover; individual consent of each respondent was also taken. About 193students were participated and 6 students refused to be the part of our study. Out of those 112 (58%) were males while81 (41%) were females, 91 were non-medical while remaining 102were medical students. Furthermore, we found that our respondents were mostly in between 20-25 years of age. According to our study 63.8% (67) population was using OTC drugs on physician's prescription whereas 31.4% (33) were using OTC as self-medication. Moreover, 50.5% (53) population considered OTC drugs as safe and effective, 11.4 % (12) of our study population preferred OTC as first line medication for minor ailments. On the other hand, almost 57.1 % (60) were taking 2-5 OTC drugs/month and among those Analgesics were on top of the list (30.5%).

Lauric acid provides neuroprotection against oxidative stress in mouse model of hyperglycemic stroke

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During ischemic stroke, higher glucose level linked worse outcomes were reported even in patients without pre-existing diabetes. Evidence suggest that such worse stroke outcomes were mainly due to production of reactive, toxic glucose metabolites that expands oxidative damage inside the brain. As a consequence of high oxidative stress, microvasculature structures and tight junctions compromised their functionally, infarct volume expands and brain edema exacerbates. In a mouse model of ischemic stroke with induced acute hyperglycaemia, Lauric acid (LA) as a natural saturated fatty acid demonstrated neuroprotection by attenuating infarct volume and brain edema. In addition, in the ipsilateral hyperglycaemic brain, the LA significantly increased the expression of tight junction representative protein (occludin) as well as anti-oxidative markers; Manganese superoxide dismutase (Mn) SOD, Extracellular superoxide dismutase (Ec-SOD) and nuclear factor-erythroid factor 2-related factor 2 (Nrf2) in the ipsilateral region against hyperglycemic ischemic stroke. LA treated animals showed a significant reduction in the production of lipid peroxidation products (4-HNE) in the microvascular structures, maintained the blood brain barrier (BBB) integrity. LA linked neuroprotective outcomes were further confirmed by behavioral tests, where functional outcomes and motor coordination were improved significantly. Furthermore, LA treatment enhanced food intake, decreased mortality rate, and net body weight loss. Conclusively, LA modulated ischemic insult exacerbated by hyperglycemia and provided neuroprotection.

Mannosylated Thiolated Nanocarriers containing Methotrexate against Arthritis

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The present study was aimed at the targeted delivery of Methotrexate (MTX) against arthritis through macrophage-targeted nanocarriers via oral route. For this purpose, mannosylated thiolated chitosan (MTCS) was prepared and the conjugation was confirmed via FTIR analysis. MTX-loaded nanocarriers were developed by using prepared MTCS and Chondroitin Sulfate (ChS) via ionic gelation method. The prepared nanocarriers were characterized in terms of size, zeta potential, SEM, and FTIR analysis. The *in-vitro* drug release, permeation enhancement, and macrophage targeting potential were evaluated. The efficacy of nanocarriers against arthritis was evaluated via *in-vivo* complete freund's adjuvant (CFA) induced arthritic-rat model. The prepared nanocarriers ChS-MTX-CS-NPs, ChS-MTX-TCS-NPs, ChS-MTX-MTCS-NPs exhibited the size of 379±97.74 nm 351±59.6 nm and 349±33.33 nm with zeta potential of 13±8.76 mV, 11±8.66 mV and 10±7.34 mV respectively. The entrapment efficiency of ChS-MTX-CS-NPs, ChS-MTX-TCS-NPs, and ChS-MTX-MTCS-NPs was found to be 68.75±4.1 %, 68.25±3.6%, and 78.60±2.3% with cumulative drug release of 60 %, 74 % and 52 % at 60 hours respectively at pH 7.4. The *ex-vivo* permeation of ChS-MTX-CS-NPs, ChS-MTX-TCS-NPs, and ChS-MTX-MTCS-NPs was 1.4×10^{-6} cm^2/s, 1.5×10^{-6} cm^2/s, and 1.8×10^{-6} cm^2/s respectively. The *in-vivo* studies in arthritic rat model exhibited that ChS-MTX-MTCS-NPs nanocarriers significantly reduced paw diameter ($P<0.05$) compared to ChS-MTX-CS-NPs and disease control. The results suggested that the macrophage targeted MTX loaded nanocarriers based on MTCS can be a promising approach for the effective treatment of arthritis.

Preparation and Characterization of Pectin based *in-situ* hydrogels for sustained release of Naproxen Sodium

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Current study aimed to prepare a hydrogel of naproxen sodium and to perform its *in-vitro* evaluation. In the past many years, various formulations of hydrogels have been made for improving the patient compliance. Hydrogels are defined as water-swollen materials which are polymeric and retain water in distinctive three-dimensional complex Naproxen sodium is a propionic acid derivative of the non-steroidal anti-inflammatory drug. Three formulations of naproxen sodium hydrogel were prepared using different concentrations of pectin via ionic gelation method. Pectin and drug were dissolved in distilled water and was mixed continuously. After adding calcium chloride, the solution was poured on the petri dish and was dried to obtain the hydrogel and then was evaluated for dehydration, swelling studies, porosity, viscosity, entrapment efficiency, thermal analysis, FTIR, *in-vitro* drug release studies and kinetic studies. F3 formulation have shown to be having the better results, because of high concentration of pectin as compare to other formulations. Dehydration, swelling studies, porosity and viscosity have indicated the formation of a suitable hydrogel. Entrapment efficiency has shown good results of percentage drug entrapped in the gel matrix. Thermal analysis (DSC/TGA) has established the stability of drug with other excipients. FTIR studies have indicated the presence of functional groups of drug and excipients in the formulations prepared. *In-vitro* drug release studies have revealed that formulation (F3) have shown a good %age drug release of 76.78%. Kinetic studies have revealed that the prepared formulations have shown Fickian release mechanism. Naproxen sodium hydrogel was successfully developed and have been evaluated successfully. This study has also revealed that the prepared hydrogel carrier system has excellent abilities in delivering the therapeutic moieties in a controlled manner

Mannose Anchored Thiolated Chitosan Stabilized Selenium Nanoparticles for Drug Delivery Applications

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Selenium nanoparticles have been used in many disease conditions including inflammatory disorders and many other diseases with reduced toxicity. This study has been designed to utilize surface decoration of selenium based nanoparticles with D-mannose to target the macrophage that would accumulate at the site of inflammation in arthritis. Four formulations were manufactured, i.e., first with selenous acid (SE-NPs), second with chitosan (C-SE-NPs), third with thiolated chitosan (TCs-SE-NPs), fourth with mannosylated thiolated chitosan (MTCs-SE-NPs). Thiol content and disulfide bond was determined of the prepared formulations. The prepared formulations were evaluated for zeta potential, scanning electron microscopy, particle size analysis, fourier transform infrared spectrophotometer (FTIR), 2,2-diphenylpicrylhydrazyl (DPPH) assay, atomic absorption spectroscopy, ex-vivo studies as well as in-vivo studies. Size of particles have confirmed formation of suitable nanoparticles in the formulation. Particle size and zeta potential were observed as 101 ± 42, 281± 26, 315± 39, 374± 36nm and 9.70 ± 8.54, 34.3 ± 13.20, 34.5± 8.56, 34.9 ± 10.20mV, respectively. The values of zeta potential were positive due to presence of cationic polymer, i.e., chitosan. In-vivo studies were performed using the arthritis model. No significant change in the studies were observed during the histopathological, X-ray and Complete blood count evaluation. The histopathological evaluation of tissues treated with mannosylated thiolated chitosan suggests that the treatment has not induced significant structural or cellular damage. X- rays of treatment groups showed less soft tissue swelling, less bone resorption and joint changes as compared to disease group.

Lamotrigne Loaded Poloxamer Based Thermo-Responsive Sol-Gel: Formulation, In Vitro Assessment, Ex Vivo Permeation, and Toxicology Study

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The present study aimed to prepare, characterize, and evaluate a thermoresponsive sol-gel for intranasal delivery of lamotrigine (LTG), which was designed for sustained drug delivery to treat epilepsy. LTG sol-gel was prepared using the cold method by changing the concentration of poloxamer 407 and poloxamer 188 which were used as thermoreversible polymers. The optimized formulations of sol-gel were analyzed for clarity, pH, viscosity, gelation temperature, gelation time, spreadability, drug content, *in vitro* drug release studies, Ex *vivo* permeation studies, and *in vivo* toxicological studies. FTIR, XRD, and DSC were performed to determine the thermal stability of the drug and polymers. The prepared formulations have a clear appearance in sol form they were liquid at room temperature and became gel at temperatures between 31^{o}C to 36^{o}C. The pH lies within the range of nasal pH between 6.2 to 6.4. Drug content was found to be between 92% to 94%. In vitro drug release studies indicated that the formulations release up to 92% of the drug within 24 hours. The FTIR, DSC, and XRD analysis showed there is no interaction between the drug and polymer. Short-term stability study indicates that formulation is stable at room temperature and at 4-8^{o}C. There is a slight increase in viscosity at room temperature which may be due to the evaporation of the vehicle. Histological study indicated that there were no signs of toxicity seen in vital organs brain, kidney, liver, heart, and spleen. It can be concluded from the above results that the prepared intranasal solgel for delivery of LTG is safe for direct nose-to-brain delivery to overcome the first-pass effect and thus enhance bioavailability. It can be considered an effective alternative to conventional drug delivery for the treatment of epilepsy.

Enhancing the Herbal Products Industry in Pakistan.: The Crucial Role of Academia in Research, Development, and Innovation

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In recent years, the global market has witnessed a significant surge in demand for herbal products, driven by a growing consumer preference for natural and holistic remedies. Pakistan, with its rich biodiversity and traditional knowledge in herbal medicine, is uniquely positioned to capitalize on this trend. However, the development and commercialization of the herbal industry in Pakistan face several challenges, including issues of quality control, standardization, and innovation. This talk proposes a strategic approach where academia plays a pivotal role in addressing these challenges and unlocking the potential of Pakistan's herbal industry. The presentation will commence with an overview of Pakistan's current herbal products landscape, emphasizing its economic prospects and inherent challenges. It will then explore global trends in the herbal market, illustrating the vast opportunities available for growth and expansion. A key focus will be on the indispensable role of academic research and development in enhancing the quality, efficacy, and safety of herbal products. This includes the development of rigorous testing protocols, standardization processes, and innovative product development, all rooted in scientific research. The talk will further delve into the critical need for bridging traditional herbal knowledge with contemporary scientific methods, highlighting how academia can facilitate this integration. This approach not only preserves indigenous wisdom but also enhances the credibility and acceptance of herbal products in the global market. Additionally, the presentation will address the necessity of specialized training and education programs. Such programs are essential for building a skilled workforce capable of driving innovation and growth in the herbal sector. The role of academicians in policy advocacy for government support and funding will also be discussed, underscoring the need for a supportive regulatory framework to foster industry growth. Concluding with case studies and examples of successful academia-industry collaborations, both locally and globally, the talk will offer actionable recommendations for academic institutions, researchers, and policymakers. The aim is to chart a future course where academia and industry work in tandem to propel Pakistan's herbal products industry to new heights, contributing significantly to the nation's economic growth and global standing in the natural health products sector.

Solubility Enhancement of Spironolactone and Furosamide By Formulating In Ternary Solid Dispersion With Adjuvant Carrier B-Cyclodextrin and Pyridoxine HCl

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The current study's goal was to use the solid dispersion approach to enhance the aqueous solubility and dissolving properties of the class II drug spironolactone and the class IV drug loop diuretic furosemide and to develop method of both drugs on HPLC. The wettability and rate of dissolution of furosemide and spironolactone improved through solid dispersion made with beta-cyclodextrin and pyridoxine. When compared to pure furosemide, even physical combinations of the drug with both polymers demonstrated improved solubility patterns. Tablets made with solid dispersions demonstrated better soloubility and also absorption phenomenon. Furosemide's and spironolactone release profile has significantly improved as compared to traditional tablets in previous formulation. Solid dispersion of furosemide and spironolactone of different ratios were prepared by solvent and evaporation method using β-cyclomide and pyridoxine which are the carrier and solubility enhancer. The physical state and interaction between the drug and carriers were characterized by FTIR. Solid dispersion especially with drug carrier ratio of 1:3:1 show a higher dissolution rate than their respective physical mixture and pure furosemide and spironolactone In the 1:3:1 optimized formulation, the average dissolving percentage for spirolactone was found to be 89.65%, whereas for furosemide it was 88.25%. FTIR analysis did not show any physiochemical interaction in the solid dispersion formulation. Due to the change in the crystalline structure of the drugs into amorphous forms and increased interaction with the carriers, the dissolution properties of furosemide and spironolactone with the use of hydrophilic carriers in solid dispersions shows better dissolution profile.

A STUDY ON PREVALENCE, MANAGEMENT OF HYPERTENSION AMONG COVID-19 PATIENTS, AND PREDICTORS OF COVID-19 SEVERITY AND MORTALITYAMONG HYPERTENSIVE PATIENTS

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Hypertension has been identified as the most prevalent cardiovascular comorbidity in patients infected with COVID-19, demonstrably increasing the risk of severity and death. Various epidemiological and clinical characteristics studies have been conducted to date. However, the data on the prevalence of hypertension in COVID-19 and its management are still emerging. Moreover, demographic and clinical risk factors of severity and mortality among hypertension COVID-19 patients during recent waves of COVID-19 in Pakistan have not been comprehensively defined. This research study evaluates the prevalence of hypertension in COVID-19 patients and their clinical characteristics and antihypertensive therapy. The study also determines the association of demographic and clinical characteristics and antihypertensive therapy with the severity and mortality of COVID-19 patients with hypertension during recent COVID-19 waves in Pakistan. A dual-phase study (retrospective and prospective) was performed at Indus Hospital and Health Network, Korangi Campus, Karachi, Pakistan. The retrospective data of 1029 COVID-19 patients admitted between April 1, 2020, and March 31, 2021were extracted from the electronic medical record database. The prospective phase included 333 COVID-19 patients admitted with pre-existing hypertension between April 1, 2021, and October 31, 2021, followed till November 15, 2021. IBM SPSS v.27 was used for the analysis. In the retrospective phase, most patients were male (68.7%), with a mean (SD) age of 57.2 (14.6) years, and aged 60 years and above (43.1%). The prevalence of hypertension among COVID-19 patients was 50.3%. A majority of the patients experienced fever before admission (78.0%), shortness of breath (75.3%), dry cough (34.4%), and productive cough (9.6%) during illness. On admission, a higher proportion of hypertensive COVID-19 patients had severe infection (43.2% vs. 35.3%) and critical infections (13.4% vs. 10.9%) compared to non-hypertensive patients, respectively. In most patients, 29.3% had cardiac arrest, followed by acute respiratory distress syndrome 17.6%, and sepsis (12.1%) during the hospital stay. Moreover, cardiac arrest and acute respiratory distress syndrome (ARDS) were significantly associated with hypertension (all p values <0.05). In the prospective phase, most patients were females (54.7%), with a median (IQR) age of 62 (55-70) years and aged less than 65 years (55.8%), smokers (5.7%), and fully vaccinated against COVID-19

(8.1%). 78.4% of patients received non-renin angiotensin-aldosterone system (non-RAAS) blockers, including calcium channel blockers (47.1%), beta-blockers (22.9%), and diuretics (22.5%). However, 15.6% of patients received renin-angiotensin-aldosterone system (RAAS) blockers such as ACEI (9.3%) and ARBs (6.3%). More than half of patients (54.4%) had a critical illness at the final stage of disease, and 44.1% of COVID-19 patients with hypertension died during the hospital stay. RAAS blockers were significantly associated with severity and mortality, whereas non-RAAS blockers were only associated with severity. In multivariate analysis, fever (aOR 3.37, 95% CI 1.06-10.74; p=0.040), shortness of breath (aOR 2.83, 95% CI 1.01-10.74; p=0.049), heart rate, >80 bpm (aOR 2.83, 95% CI 1.09-7.32; p=0.032), elevated neutrophil count, >75 (aOR 3.52, 95% CI, 1.08-11.34 p=0.036), elevated high sensitivity troponin I >34 (aOR 3.05, 95% CI, 1.47-8.87; p=0.041), elevated D-Dimer, >0.5 (aOR 6.37, 95% CI 2.29-17.65; p<0.001), and corticosteroid use (aOR 17.03, 95% CI 5.07-57.19; p<0.001) were associated with the severity of patients. Similarly, another multivariate binary logistic regression model showed patients aged ≥ 65 years (aOR =2.84, 95% CI 1.43-5.60; p=0.003), severe cases (aOR 7.16, 95% CI 3.01-17.07; p<0.001), elevated high sensitivity troponin I >34 (aOR 2.61 95% CI 1.34-5.05; p=0.005), elevated serum ferritin >220 (aOR 3.20, 95%CI 1.10-9.31; p=0.034), random blood sugar >140 (aOR 2.31, 95% 1.14-4.70; p=0.021), antibiotics use (aOR 2.61, 95% CI 1.35-5.05; 0.004), antifungal use (aOR 4.32, 95%CI 1.32-14.16; p=0.016), and corticosteroid use (aOR 4.55, 95% CI 1.01-20.40; p=0.048) were associated with mortality. However, regarding antihypertensive therapy, RAAS blockers (aOR 0.23, 95%CI 0.09-0.56; p=0.001) showed a negative associated with mortality, keeping all other variables constant. In conclusion, this study provides insights into COVID-19 in hypertensive patients in Pakistan, determines a high prevalence of hypertension in COVID-19 patients and the association of demographic and clinical characteristics with increased severity, mortality, and complications, and highlights the importance of antihypertensive therapy and monitoring of these patients. In addition, the study also identified the predictors of severe illness and mortality in hypertensive COVID-19 patients, including the protective effect of RAAS blockers. Healthcare professionals should monitor hypertensive COVID-19 patients, particularly older ones, for worsening symptoms and prioritize care and interventions effectively. Moreover, RAAS blockers may be continued to manage hypertension in COVID-19 while monitoring other coexisting conditions.