



PHARMLINE

Official Publication of the Kerala Pharmacy Graduates' Association,
Thiruvananthapuram, Kerala, India



Special Edition

**PHARMACY
PRACTICE**

In the Middle East

Vol 23

Issue 3

August 2024



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Image generated using Magic media (AI) from the prompt 'Indian Pharmacist'

From the Chief Editor's Desk



Prof. Dr. Bobby Johns G

Dear Readers,

As we approach the end of another impactful year, I am excited to share updates that signify the growth and evolution of the Pharmacy Profession in Kerala. The Kerala State Pharmacy Graduates' Association (KPGA) has been instrumental in championing initiatives that empower Pharmacy Professionals, enhance education, and foster a spirit of research and innovation across the state.

The Kerala Pharmacy Graduates' Association (KSPGA) has been highly active over the past few months, organizing a series of impactful seminars, Faculty Development Programs (FDPs), and other initiatives aimed at enhancing professional skills and knowledge.

We celebrated World Pharmacists Day in September 2024 with colorful events and are planning to conduct National Pharmacy Week celebrations across the state in the month of November.

Looking forward, it is with great enthusiasm that we announce the Second Kerala Pharmaceutical Congress (KPC) 2025, set to take place at Caritas College of Pharmacy, Kottayam, in February, 2025. This year's congress will focus on the theme "AI and Emerging Technologies: Transforming Pharmacy Education and Industry." This timely and pertinent theme reflects the profound impact that artificial intelligence and new technologies are having on our profession, reshaping pharmacy education, research, clinical practice, and the industry at large. With these advancements come both opportunities and challenges, and KPC 2025 will serve as a platform to explore, discuss, and strategize on how best to integrate these innovations into our field.

The congress will bring together industry leaders, academicians, researchers, and students to engage in discussions, workshops, and seminars that promise to be insightful and inspiring. We are confident that KPC 2025 will pave the way for future-ready pharmacists equipped with the knowledge and skills needed in this era of rapid technological change.

As always, I extend my heartfelt thanks to the readers, contributors and supporters of Pharmline. I am optimistic that your dedication continues to uplift our profession to excellence in near future.

Regards,

Prof. Dr. Bobby Johns G
Chief Editor, Pharmline

The President Speaks



Dr. PK Sreekumar

Dear Members,

Warm Greetings to all !

As we embark on another exciting chapter in our Association's journey, I am pleased to share some important updates that will shape the future of pharmacy in Kerala.

First, I am delighted to announce the Kerala Pharmaceutical Congress (KPC) 2025, set for February 21 and 22 at Caritas College of Pharmacy, Kottayam. This event will provide a platform for professionals, academicians and students to exchange knowledge, discuss trends, and explore the future of our profession. The two-day congress will provide an optimistic platform where government officials, industry experts, distinguished scholars, research scientists, and all other segments of the pharmaceutical sector are united. Your active participation will be the key to its success.

Next, World Pharmacists Day will be celebrated on 25th September 2024, with the theme "Pharmacists: Meeting Global Health Needs." Last year, five colleges collaborated with KPGA to celebrate this day through symposiums, seminars, webinars, and more. We are excited to continue this collaboration, expanding our impact and strengthening ties between professionals and students across the state.

Additionally, KPGA is launching a fund raising campaign for charity and welfare, supporting senior members facing financial challenges. The generous contributions pledged by KPGA veterans Mr. Venkatakrishnan and Mr. A.K Chandrashekan, set an inspiring example of solidarity, motivating others to follow their lead in supporting this noble cause.

Finally, we are proud to have distributed cheques to students selected for the KPGA Student Research Support Scheme, encouraging research and innovation among future pharmacists.

These initiatives underscore KPGA's commitment to advancing the profession and supporting its members. I firmly believe that the unwavering support, love, and blessings of our seniors, peers, and aspiring pharmacists are instrumental in the growth and prosperity of KPGA.

Warm regards,

Dr. PK Sreekumar

President, Kerala Pharmacy Graduates' Association

EXOSOMES: AN INEXORABLE NEW POTENTIAL VEHICLE FOR DRUG DELIVERY

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Article Received: May 03, 2024

Accepted: July 31, 2024

Published: Aug 31, 2024

Abstract

Exosomes are the subgroup extracellular vesicles, with tremendous advantages in the field of nanotechnology. These are the tiny bilayer vesicles of size ranges from 50 to 150nm. These lipid-bound vesicles offer better drug delivery than any other. These extracellular vesicles carry natural cargo molecules effectively to the near or distant targeted sites. In some studies, it clearly supports the fact that, they can be applied for therapy related to tumour and other infectious disease. This review aims to present the importance of exosomes as a drug delivery system and its future concerns.

Keywords: Exosomes, Extracellular vesicles, Drug delivery system, Nanotechnology

Introduction

Nanotechnology based applications have a promising role in the present world. Nanoparticle based drug delivery system offer targeting of therapeutic agent to the targeted site. Compared to other vesicular drug delivery systems, it was found that exosomes can surmount the difficulties in drug delivery. The interactions produced by the drug delivery through other routes can be configured via this system. As a result, targeted delivery exosomes could be used for therapeutic purposes. A producer cell release exosome, which can act as a communication line between cell-to-cell in the body. Some of the recent researches come up with the potential effects of extracellular vesicle and their action in targeted drug delivery. Extracellular vesicles are getting noticed as potential vehicles by the feature such as biocompatibility, reduced immunogenicity, improved circulation stability and toxicity. These are the ideal drug carriers, which aid more advantages than conventional drug carriers and gene delivery. As this system is biologically derived, it can be applied for wider aspects to alter biological distribution, uptake, and controllable responses. Because of the efficient features of exosome in drug delivery, they can also said to be naturally-equipped nanocarriers. In this review, it aim to highlight the importance of exosome in the therapy, their advantages and future perspectives.

Advantages of Exosome drug delivery

1. It has small size for penetration into deep tissues.
2. It has slightly negative zeta potential for long circulation.
3. Deformable cytoskeleton.
4. They facilitate intercellular communication without direct cell-to-cell contact.
5. Protection of specific mRNAs, regulatory microRNAs, lipids and proteins.

Structure and Biogenesis of Exosomes

Since exosomes are derived from cells, they have similar structure as that of cells. Exosomes contain phospholipid bilayer, membrane proteins, cytoplasmic proteins, DNA, RNA etc. It consists of all the components like that of parent cells, except organelles. Exosomes performed extraordinary roles in biological processes and involved in cell-to-cell communication. It act as a mediator in cell-to-cell communication without any direct contact to the cells. As exosomes are generated from parent producer cells, even though they require other techniques for further modifications. After the clear understanding about their structural feature is, it can be subjected to change or modifications that lead to the formation of capable exosomes which have a great influence in therapeutic efficacy. They are originating in the multivesicular bodies, and get fused with plasma membrane after they released into the environment. Due to their stability in blood,

they can travel throughout under physiological and pathological conditions. Also it can penetrate even to blood brain barrier. With the help of biofluids, exosomes can transfer proteins, lipid, nucleic acid, RNA etc. Exosomes consist of lipid bilayer membrane. The membrane characterized with 50-100nm in diameter. These are also enriched with protein markers like tetraspanins. Exosomes were thought to be waste products from the maturing red blood cells, later some studies became a bridge to clarify its role. These vesicles characterized to be membrane-bound extracellular vesicles released by exocytosis after fusion of cell membrane with intracellular multivesicular bodies (MVBs). These are found in body fluids, including blood, breast milk, urine, saliva, adipose tissue etc. Under various investigations, it was found out that the exosomes can act as naturally-equipped nanocarriers. It is more advantageous than synthetic drug carriers, because exosomes are isolated from the patient's own cell. Thus, it results a lower toxicity and increased biocompatibility. The exosome formation can be explained through different mechanisms. The most common mechanism is the endosomal sorting complex required for transport (ESCRT). The ESCRT system contains four protein complexes: ESCRT-0, ESCRT-1, ESCRT-2, and ESCRT-3.

Uptake of Exosome

It was found that, the cellular entry routes of exosomes include phagocytosis, receptor-mediated endocytosis etc. As exosomes are cell derived agents, they can enter the cells via various routes. The proteins in the exosomal surface and the membrane of targeted cells might interact. It is common that the exosome protein interact with target cells. This reaction is required for internalization. For example, the uptake of exosomes by dendritic cells (DCs) is reduced after treatment of recipient cells with a CD9 antibody against tetraspanin. Further investigations are undergoing for the detailing of exosome uptake. Micropinocytosis which is an important mechanism and typically occurs in highly folded region of plasma membrane. For example, through micropinocytosis oligodendrocyte-derived exosomes can be transferred into microglia. Some studies revealed that the exosome uptake may be affected by intracellular Ca^{2+} accumulation. Another major factor is the cellular pH. The exosome secretion and uptake by target cells

increase when there is a low pH in the microenvironment. The cargo exosomal uptake is mainly occurring due to receptor-ligand interaction, exosomal content into the cellular cytoplasm by the direct fusion of exosomes with the plasma membrane of the recipient cell, endocytosis by phagocytosis.

Source, Extraction and Isolation

As mentioned earlier, exosomes are present in all body fluids and they can be isolated to cope up with the clinical needs. And the isolation of the same from body fluids might be insufficient to achieve clinical needs in most of the cases. So there require some alternative sources. Exosomes are also available from non-human sources such as bacteria, plants, milk etc. They can be used as personalized oral delivery vehicles due to their easy availability and less toxicity. Various studies are there, portraying the effects of plant-derived exosomes in cancer. The exosomes derived from lemon, grapes, ginger, grapefruit etc are embedded with nanoparticles. A study in mice revealed that, milk can act as good delivery vehicle for hydrophilic and lipophilic drugs, including chemotherapeutic agents. And there showed some drastic changes in cancer cells. As milk is a natural source and the RNA present in it can directly or indirectly affect the growth of cancer cells. The bacterial-derived exosomes can act against specific pathogens too.

Some reproducible isolation techniques are used for the efficient isolation of exosomes. The isolation techniques determine the quality and purity of exosomes.

a. Ultrafiltration

Ultrafiltration along with ultracentrifugation and gel filtration chromatography is effective for the isolation of exosomes. This technique uses precise pore sized filters which helps to separate particles. The vesicles obtained through this method has much more purity as compared to ultracentrifugation method.

b. Ultracentrifugation

Ultracentrifugation is the most common and widely using method by most of the researchers for the exosome isolation. The extraction is followed by the principle of density differences and size of exosomes. The centrifugation of samples were carried out at 300 g, 2000 g, and 10,000 g

respectively. The supernatant solution was then subjected to ultracentrifugation in twice speed results in the yield of exosomes.

a. Hydrostatic Filtration Dialysis

This method follows the isolation vesicles by the diffusion of solute via cellulose ester dialysis membrane. The filtration concentration dialysis can be obtained after the passage of solvent under hydrostatic pressure. Through this method, can achieve concentrate sample and efficient pretreat. This method is more convenient and can be applied for wide range of sample volumes.

a. Size-Exclusion Chromatography

This technology is also similar to that of ultrafiltration. The sample is added through the porous beads, the passage may occur based on the particle size. The larger particles cannot pass through the gel pores and thus the elution speed is faster. The exosome separation can be accomplished by gravity or low speed centrifugation in this method.

a. Polymer Precipitation

This method has been used for the exosomal isolation for recent years. Protein organic solvent precipitation (PROSPR), protamine, acetate, polyethylene (PEG) are the reagents used for the same. Among which PEG is the most common reagent for the polymer based exosome isolation. This method is devoid of time consuming process and complex devices. Through this method exosomes are obtained by simple and low-speed centrifugation. Other advantage is that, we can handle large sample sizes, and is easy to combine with existing separation methods.

a. Exosome Separation Kit

Based on various researches, the separation kit has sprung up more extensively. Even though, this is not a specific technology but follows the principle of size exclusion chromatography, chemical precipitation, centrifugation, immunoaffinity. Invitrogen (United States), Exospin (Cell guidance systems, United Kingdom), Eloquence (System Biosciences, United States) are some of the exosome separation kits. Such kits can be used for the isolation of exosomes from biological samples.

a. Cargo encapsulation

The drug loading in exosome should be carried

in a well established condition. Some recent researches revealed that, the structure of exosome might be damaged due to external stimulation. Physical methods including electroporation, ultrasonication, extrusion, agitation etc. can be followed for the same. For the loading of drugs, the cell's endogenous machinery being added to the culture medium. The two phases of drug packing to exosome include; Presecretory Drug Loading and Post secretory Drug Loading.

Presecretory drug loading

1. Co-incubation

In this method, the drug is co-incubated with the cells, so that the drug can enter the cell. This follows a simple operation but with low drug loading efficiency. In a study related to Alzheimer's disease-targeted therapy, it was clear that the exosomes can specifically bind to lymphocyte function-associated antigen 1 (LFA-1) and intracellular adhesion molecule-1 (ICAM-1) in the brain.

1. Transfection

Proteins, peptides, nucleic acids, and other active molecules can be packed into exosomes via this method. Through this process, a target gene is introduced into the cells, also post secretory drug loading can also be performed. Contamination or damage may occur to exosomes if it is followed by direct chemical transfection.

Post secretory Drug Loading

1. Electroporation

This method involves the loading of small molecule drugs to exosomes by the means of an external electric field just beyond the exosome membrane. By the use of short high-voltage pulses, the lipid layer instantaneously ruptures, creating a transient state of membrane permeability. In several studies, to restore membrane integrity researchers incubate electroporated exosomes for a period. It is common that after electroporation technique, there is a high chance of aggregation of exosomes. In order to avoid the aggregation, membrane stabilizers such as trehalose can be used. The disadvantage of the electroporation technique is low loading efficiency due to the disruption of exosomal membrane integrity.

2. Sonication for Loading Small-Molecule Drugs

In this method, mechanical shear force is applied by an ultrasound probe to deform exosome membrane which aid drugs to enter the exosomes. Some investigations revealed that this method showed enhanced antitumour effects. Yerneni et al., loaded albumin and curcumin sequentially into exosomes through sonication and it results in the formation of carrier exosomes (CA-EVs) with high stability and anti-inflammatory effects. continuous drug release and high drug loading efficiency are most commendable advantages of this method. Due to its strong potential for drug delivery optimization, this method can be employed in the developing novel exosome drug delivery systems.

3. Extrusion

Hence this is a physical method, the mixture of drugs and exosomes is extruded through a polycarbonate porous membrane. During the passage, the exosome membrane is damaged and ruptured and are uniformly loaded with small molecule drugs. This is considered as a most efficient technique for loading water-soluble cargoes.

1. Freeze-Thaw Cycle

The mixed solution containing exosomes and drugs is incubated at 37 °C in this method. Later the solution is snap-frozen at -80 °C, and thawed at room temperature. This should be repeated for at least 3 cycles. The drug loaded exosome particles are large due to aggregation. Exosomes can be fused with liposome membranes to obtain engineered hybrid exosomes. This method is easier but offer low drug-loading efficiency. One of the major disadvantage of repeated freezing and thawing is that the protein may be inactivated.

1. Dialysis

In the dialysis method, exosomes and drugs are transferred to a dialysis membrane or dialysis tube and placed in a near-neutral buffer. Later, the drug loaded exosomes are obtained by stirring dialysis. It is a prime thing to maintain pH gradient inside and outside the exosome membrane. For this purpose, the exosomes in the dialysis system can be pre-dehydrated in ethanol and then rehydrated in an acidic buffer to reduce the pH

inside the exosomes. The disadvantage of this method is that, it may lead to the degradation of protein or peptide cargo.

Contributions of Exosomes

a. Exosomes in cancer treatment

Exosomes can be used as the major components in the anticancer therapy. It was found that, exosome based formulation can continuously developed to improve biodistribution and also pharmacokinetics of anti-cancer drugs while reducing their side effects. It is familiar that, during the process of tumorigenesis, normal cells are transformed into cancerous cells. Subsequently exosomes are secreted which have the potential to transform the healthy cells to cancerous cells. As a paramount, it has been widely reported that tumor-derived exosomes show promoting effect on tumor growth. Several studies have shown the relationship between exosome and immune system function. Such studies suggested that exosomes can interact through signaling and the exosome comes from immune cells. It is revealed that, in mammalian cells, exosomes have pro and anti-inflammatory properties depending on the type of cell origin. The study of Zhang et al. has demonstrated that exosomes are involved in cell-to-cell contact during immune responses for infectious diseases, tumorigenesis, autoimmune diseases, and allergies.

b. Exosomes for Wound Healing

It has been reported that, exosomes derived from mesenchymal stromal cells (MSCs) have a great potential for wound healing. According to the theoretical context, wound healing involves the repair of damaged epidermis or dermis of the skin. Some researches pointed out as exosomes possess the advantages of easy administration, the ability to control inflammation, low immunogenicity, promote cell proliferation, and angiogenesis. The exosomes which are derived from stem cells regulate the inflammatory response by controlling the the polarization of inflammatory cells and macrophages.

a. Platelet Rich Plasma-Derived Extracellular Vesicles

Platelet Rich Plasma has achieved predominant concentration in this period. PRP treatment can help to support wound healing in trauma and joint injury. Exosomes are combine with this technology

to promote faster relief, faster return to activity, and decreased swelling at the injection site. Hangyu Zhao et. al has studied the effects of exosomes derived from platelet-rich plasma in the treatment of knee cartilage defects in rats. The study revealed that, intra-articular injection of PRP-exosome can promote the repair of articular cartilage defects. While both exosomes and PRP can be suggested for hair growth therapy also. They encourage hair growth and target different body components. Exosomes helps in the regeneration of hair follicles. Exosomes are released by cells when they get fuse and they contain a mixture of DNA, RNA, and proteins, which influence cell behaviour. Exosomes are injected into the damaged regions of the scalp to promote hair regeneration and they carry the instructions for cell regeneration and signals to initiate cell processes. Exosomes with a small size of 20-100 nanometers are commonly using for the therapy, which are thought to penetrate deep within the targeted tissue when injected.

Future perspective

Exosomes are the natural agents and most promising one for the future drug delivery. As it is derived from the cells, posses strong biocompatibility and can use as vectors for various clinical applications. As mentioned above exosomes posses some risks such as immunosuppression and tumorigenesis. The advantages include less toxic, promote regeneration, biocompatible and biodegradable. As exosomes can be effectively used in combination with PRP, it possessing much demand for future applications. So the concept of utilizing exosomes as delivery vehicles and application of exosomes are more attractive and promising for future application.

Conclusion

From various aspects it is clear that exosomes can be effectively used as a cell-based drug delivery system. Drugs can be loaded and targeted via exosomes in the form of proteins, nucleic acids, and small-molecule chemotherapeutics. The drugs can be loaded in to

the exosomes according to their properties. The blood brain barrier penetrating efficiency of exosomes promote them as a significant potential for treating brain tumours. And the regenerative application gained much interest in consumers which enhance bioavailability. So the exosomes are worth for their various applications. Despite of the less loading capacity, the excellent properties of exosomes clearly indicate that they are the much demanding and worthwhile agents for drug delivery.

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Cite this article: Pharmline 2024;23(3): 6-10 Reshma KJ
Exosomes: An inexorable new potential vehicle for drug delivery

Pharmacy Practice in the Sultanate of Oman

The Sultanate of Oman is witnessing a progress in various fields that coincides with efforts from various government departments to meet the goals of Oman's Vision 2040. The Ministry of Health, represented by Drug Safety Center, seeks to keep pace with this development and to be a part of the government's success through continuous development and effective progress in the field of medicine and medical devices regulation and completing the construction of the regulatory system to pursue global excellence. This is to ensure the availability, quality, effectiveness, safety and security of medicines and medical devices circulating in the Sultanate of Oman.

The 5 units of Drug Safety Center include,

- Pharmacy Licensing Department
- Drug Control Department
- Central Quality Control Department
- Pharmacovigilance and Drug information Dept.
- Medical Devices Control Department

Pharmacy practice in Oman

Pharmacy practice in Oman is regulated by the Drug safety Center of Ministry of Health (MOH) and is evolving rapidly to meet international standards of healthcare. With a growing healthcare system, the role of pharmacists is becoming more prominent, particularly in areas such as medication management, patient counseling, and clinical pharmacy services. Below are the key aspects of pharmacy practice in Oman.

1. Regulation and Governance

Ministry of Health (MOH): The MOH regulates all aspects of healthcare in Oman, including pharmacy practice. This includes licensing pharmacies, regulating the sale of medications, and overseeing the qualifications of pharmacists.

Oman Pharmaceutical Society (OPS): This professional organization supports the development of pharmacy practice in Oman through education, training, and advocacy.

Pharmacy Law: Oman's pharmacy law (Royal Decree 35/2015) governs the operation of pharmacies, the sale of medications, and the professional standards required for pharmacists.

2. Pharmacist Education and Licensing

Pharmacy degree: Pharmacy degree in Oman makes up to 5-year in Bachelor of Pharmacy and 4-year in diploma of pharmacy. The curricula of the Pharmacy Programme include basic sciences,



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Pharmacy practice in Oman is evolving in line with global trends, with a strong focus on patient care, medication safety, and the development of clinical pharmacy services. Pharmacists are taking on broader roles in public health, disease management, and patient counseling, making them integral to the healthcare system.

Pharmaceutical sciences, Pharmacy Practice, and experiential learning. Students are posted in different healthcare sectors and facilities during experiential learning to gain the practice experience. Graduates must complete an internship programme in various healthcare settings, including hospitals, polyclinics, health centres, and community pharmacies.

Pharmacist licence: Medicines can be dispensed only by a MOH licensed pharmacist, which is a person holding a bachelors degree from a recognised university. Pharmacists and assistant pharmacists should fulfil the pharmacy licensing conditions and pass the Prometric exam to register and practice pharmacy profession. International Pharmacists should fulfil the pharmacy licensing conditions and pass the Prometric exam & viva to register and practice pharmacy profession. Licenses are granted for up to two years and are capable of being renewed.

Continuing Professional Development (CPD) is mandatory for pharmacists to maintain their licenses, ensuring they stay updated on new developments in the field.

3. Types of Pharmacies

Community Pharmacies: These are the most common type of pharmacies in Oman, providing over-the-counter (OTC) medications, prescription drugs, and healthcare products. Pharmacists in community pharmacies often provide patient counseling on the use of medications.

Hospital Pharmacies: Hospital pharmacists work closely with doctors and other healthcare professionals to manage medications for inpatients and outpatients. They play a key role in ensuring the safe and effective use of medications within the hospital setting.

Clinical Pharmacies: Clinical pharmacy is an emerging field in Oman, with pharmacists working as part of multidisciplinary healthcare teams to optimize medication therapy, particularly for chronic diseases like diabetes, hypertension, and cardiovascular diseases.

4. Scope of Practice

Dispensing Medications: Pharmacists in Oman dispense prescription-only medications (POM) and OTC drugs. They are responsible for ensuring that patients understand how to use their medications properly, checking for possible drug interactions, and monitoring patient adherence to treatment.

Patient Counseling: Pharmacists provide patient education on the correct use of medications, potential side effects, and drug interactions. This role is particularly important for chronic disease management and the use of high-risk medications like antibiotics or insulin.

Medication Therapy Management (MTM): Although still developing, pharmacists in Oman are increasingly involved in MTM, where they help patients manage complex medication regimens, especially for chronic illnesses.

5. Regulation of Medications

Prescription Medications: The sale of prescription medications is tightly regulated. Only licensed pharmacists can dispense prescription drugs, and they require a valid prescription from a registered healthcare provider.

Monitored Medicines: Vaccines, plasma products, potent steroids, tretinoids etc. that come under monitored medicine category are

subject to stricter regulations and must be imported and dispensed according to MOH guidelines.

Controlled Substances: Medications that fall under controlled substance categories, such as opioids or psychotropic drugs, are subject to stricter regulations and must be dispensed according to MOH guidelines to prevent misuse and addiction.

OTC Medications: Pharmacists can dispense certain medications without a prescription, but they are expected to provide advice to patients to ensure safe and appropriate use.

6. Pharmacy Practice Standards

Pharmacists in Oman must follow the Good Pharmacy Practice (GPP) guidelines, which are aligned with international standards. These guidelines ensure that pharmacies provide high-quality services and that medications are dispensed safely and accurately.

Pharmaceutical Care : Pharmacists are increasingly adopting a patient-centered approach known as pharmaceutical care, which involves direct engagement with patients to optimize medication outcomes and improve overall health.

7. Pharmacy Services in Public Health

Pharmacists in Oman contribute to public health through services such as immunization, smoking cessation programs, and health screenings for conditions like diabetes and hypertension.

They also play a role in the rational use of medicines, helping to reduce the overuse of antibiotics and educating the public on the importance of completing antibiotic courses.

8. Technology in Pharmacy Practice

Electronic Health Records (EHR): Pharmacists in Oman are increasingly using EHR systems to access patient health information, allowing for better coordination of care and more accurate medication management.

E-Prescriptions: The use of electronic prescriptions is growing, reducing the chances of medication errors and making the dispensing process more efficient.

Pharmacy Automation: Some hospitals and larger pharmacies are adopting automation

technologies to streamline the dispensing process and ensure precision in medication handling.

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9. Challenges and Opportunities

Challenges

Medication Misuse: Like in many countries, Oman faces challenges with the misuse of certain medications, particularly antibiotics and controlled substances.

Pharmacist Shortage: There is a growing demand for qualified pharmacists, especially in rural areas and in specialized fields like Clinical pharmacy, Regulatory Affairs and pharmacovigilance.

Chronic Disease Management: With the increasing prevalence of chronic diseases, pharmacists need to take a more active role in disease management and patient education.

Opportunities

Expansion of Clinical Pharmacy: As Oman continues to develop its healthcare infrastructure, there is significant potential for the expansion of clinical pharmacy services, where pharmacists can work more closely with healthcare teams to improve patient outcomes.

Pharmacist-Managed Care: Pharmacists can take on greater responsibilities in managing chronic conditions, such as diabetes, cardiovascular diseases, and asthma, by providing medication management services and patient education.

Telepharmacy: With advancements in technology, there are opportunities to expand telepharmacy services in rural or remote areas, improving access to pharmacy care.

Conclusion

Pharmacy practice in Oman is evolving in line with global trends, with a strong focus on patient care, medication safety, and the development of clinical pharmacy services. Pharmacists are taking on broader roles in public health, disease management, and patient counseling, making them integral to the healthcare system. As the profession continues to grow, there are significant opportunities for the advancement of pharmaceutical care and the integration of pharmacists into multidisciplinary healthcare teams.

The evolving landscape of Pharmacy Practice in Dubai



Ms. Veena Rajesh,
Senior Pharmacist, Dubai Duty Free

Dubai's pharmacy landscape has undergone a significant transformation in recent decades. The city has witnessed remarkable improvements in the quality of pharmaceutical services, integration of technology, and implementation of stringent regulatory standards. These advancements prioritize patient safety and satisfaction, creating a more robust healthcare system. Let's explore the advancements and the exciting possibilities that lie ahead.

Dubai's Pharmacies: A Hub of Innovation and Patient Care

The city has witnessed significant progress in several key areas. Pharmacies are embracing digital solutions to streamline inventory management, prescription processing, and patient records, enhancing both efficiency and accuracy. Pharmacists are taking a more active role in patient care, providing medication therapy management, personalized counseling, and chronic disease management services.

The Dubai Health Authority (DHA) has implemented stringent regulations to ensure the quality, safety, and efficacy of pharmaceutical products, fostering continuous improvement in pharmacy practice standards. The adoption of telepharmacy services is expanding access to care, especially in remote areas. Patients can now consult with pharmacists remotely for medication-related concerns.

Looking Ahead: The Future of Pharmacy in Dubai

The future holds even more promise, with advancements in technology, regulations, and patient-centered care driving further innovation. Pharmacogenomics may allow Dubai pharmacies to offer personalized medication regimens based on patients' genetic profiles, optimizing treatment outcomes and minimizing adverse effects. Pharmacists may gain additional responsibilities, such as prescribing certain medications, administering vaccinations, and conducting health screenings, further integrating them into the healthcare team.

There could be a shift towards preventive health

Dubai's pharmacy landscape has undergone a significant transformation in recent decades. The city has witnessed remarkable improvements in the quality of pharmaceutical services, integration of technology, and implementation of stringent regulatory standards. These advancements prioritize patient safety and satisfaction, creating a more robust healthcare system. Let's explore the advancements and the exciting possibilities that lie ahead.

care, with pharmacies offering wellness programs, health education sessions, and preventive screenings to promote public health and disease prevention. Dubai pharmacies may leverage digital health platforms like mobile apps and remote monitoring devices to facilitate medication adherence, chronic disease management, and virtual consultations.

Community Pharmacies vs. Airport Pharmacies: Tailored Services for Diverse Needs

Dubai boasts two distinct pharmacy settings, each catering to specific populations. Community pharmacies are widespread throughout the city, offering convenient access to residents and visitors. They cater to a varied clientele, including locals, expatriates, and tourists, with a broad range of healthcare needs.

Community pharmacies offer prescription dispensing, over-the-counter medication sales, health screenings, and medication counseling. Pharmacists build relationships with patients,

providing personalized care and addressing individual health concerns. They adhere to DHA regulations to ensure product quality, safety, and efficacy.

Pharmacies in Dubai International Airport offer convenient access to medications and healthcare products for travelers passing through the airport. They primarily serve travelers, transit passengers, and airport employees, catering to their immediate healthcare needs during their stay.

While offering essential services like medication dispensing and over-the-counter sales, the range of services may be more limited compared to community pharmacies. Pharmacists prioritize efficiency and quick service to accommodate the fast-paced nature of their clientele. Like community pharmacies, airport pharmacies also adhere to DHA standards for quality and safety.

Obtaining a Pharmacist License in the UAE

For those seeking to practice pharmacy in Dubai or other emirates like Abu Dhabi and Sharjah, here's a general overview of the licensing process: The first step is to ensure you meet the eligibility criteria set by the respective Health Authority. This typically includes a bachelor's degree in pharmacy from a recognized institution, supervised internship experience, and passing relevant exams.

Next, gather required documents such as passport copies, educational certificates (attested if obtained outside the UAE), transcripts, internship completion certificate, good standing certificates from previous employers (if applicable), passport-sized photographs, and any additional documents specified by the Health Authority.

Depending on the Health Authority, you may need to demonstrate proficiency in Arabic or English through a language test. Submit your application through the respective Health Authority's online portal, filling out the form accurately and attaching all required documents. Pay the application and licensing fees, which vary depending on the Health Authority and license type.

Prepare for and pass any required examinations, such as a competency or licensing exam conducted by the Health Authority. Some Health Authorities may require an interview as part of the licensing process. Undergo a background check to ensure compliance with professional

and ethical standards. Upon successful completion of the application process, including exams and interviews (if applicable), the Health Authority will issue your pharmacist license. It's important to note that specific requirements and processes may vary slightly between Health Authorities within the UAE. Therefore, consult the respective Health Authority's website or contact their licensing for the most accurate and up-to-date information.

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PHARMACY PROFESSIONALS– QUALIFICATION AND REQUIREMENTS IN THE KINGDOM OF BAHRAIN



Mr. Shanavas Nedumparambil
Medical delegatee

Pharmacy practices in Bahrain are governed by a structured regulatory framework, ensuring safe and effective medication use across the country. The National Health Regulatory Authority (NHRA) oversees the licensing of pharmacies and pharmacists, ensuring compliance with international standards and ethical practices.

Pharmacy practices in Bahrain are governed by a structured regulatory framework, ensuring safe and effective medication use across the country. The National Health Regulatory Authority (NHRA) oversees the licensing of pharmacies and pharmacists, ensuring compliance with international standards and ethical practices. Below are key aspects of pharmacy practices in Bahrain.

PHARMACIST LICENSING AND EDUCATION

Pharmacists in Bahrain are required to have a valid license from the NHRA to practice.

Educational requirements include a Bachelor of Pharmacy (BPharm) or equivalent degree from an accredited institution.

Continuing professional development (CPD) is also mandatory to ensure pharmacists stay updated with the latest developments in the field.

TYPES OF PHARMACIES

Community Pharmacies: These serve the general public and are widely distributed across Bahrain, offering over-the-counter (OTC) drugs and prescription medications.

Hospital Pharmacies: Located within hospitals and clinics, they provide medications to inpatients and outpatients under direct supervision of healthcare professionals.

Specialty Pharmacies: These pharmacies focus on specific medications for chronic conditions, such as cancer or diabetes, and provide patient counseling and education.

REGULATIONS AND STANDARDS

Prescription Control: Prescription-only medications are strictly regulated. Pharmacists can only dispense such medications with a valid prescription from a licensed physician.

Medication Safety: Pharmacists must adhere to safety protocols, including checking for drug interactions, allergies, and proper dosages.

Good Pharmacy Practice (GPP): Bahrain follows international guidelines, ensuring that pharmacists offer patient-centered services, promote the safe use of medications, and maintain high ethical standards.

TECHNOLOGY AND AUTOMATION

Pharmacies in Bahrain are increasingly adopting electronic health records (EHR) and prescription systems, making it easier to track patient medication histories and improve accuracy in dispensing.

Some larger hospitals use automated dispensing systems to ensure precision and reduce human error in medication distribution.

ROLE OF PHARMACISTS

Pharmacists in Bahrain play an active role in healthcare beyond just dispensing medications. They offer medication therapy management, patient education, and help in managing chronic diseases by advising on medication adherence.

CHALLENGES AND OPPORTUNITIES

Challenges: One of the main challenges is maintaining a balance between accessibility of medications and preventing misuse, particularly with controlled substances. There is also a need for more pharmacists specializing in advanced fields like pharmaco vigilance and clinical

pharmacy.

Opportunities: As Bahrain continues to modernize its healthcare system, the role of pharmacists is expanding, providing opportunities in clinical research, personalized medicine, and public health education.

Bahrain's pharmacy practices reflect a commitment to providing safe, accessible, and high-quality pharmaceutical care to its population.

LICENSURE GENERAL REQUIREMENTS

All applicants must fulfill all the following requirements in order to qualify for licensure. Non-Bahraini pharmacy professionals applying for a license must be no more than 65 years of age.

EDUCATIONAL QUALIFICATIONS

- Academic qualifications will be evaluated by NHRA
- Qualifications must be issued by institutions/colleges recognized in home country. Professional qualifications are evaluated in accordance with the following criteria:
 1. The country and institution from which the qualification was awarded
 2. The level of national recognition of the qualification
 3. The duration and curriculum of study, and the presence of clinical practice/practice training
 4. Qualifications acquired through honorary nature, correspondence, or online distance learning are not counted towards the PQR. Qualifications not mentioned in this document may be evaluated and reviewed by NHRA Committee, to determine the eligibility for appropriate professional title.
 5. NHRA Committee will be responsible for evaluating the academic qualifications and all specialized certificates issued by universities outside the Kingdom of Bahrain while preserving its right to reject any certificate that violates the regulations and standards approved by SCH. The Committee may also change as it deems appropriate whenever the need arises.

PROFESSIONAL EXPERIENCE

- The applicant's experience must be relevant to the category applied for and must have been accomplished in an appropriate setting

licensed by the professional regulatory and licensing authority in the country of practice.

- Bahraini nationals are exempted from experience requirements for the basic entry level.
- All other applicants are required to fulfill experience as per their relevant titles according to the PQR.
- The applicant must provide evidence of meeting the minimum required experiences for the applied category.
- The applicant's experience must be practical clinical experience gained by a licensed healthcare professional.
- Non-clinical practice eg. (administrative, academic, and research) is not fulfilled for the NHRA license requirements.
- Practitioner who has experience in more than one country and this experience is considered the minimum experience required for the applied category must provide evidence of the registration and have a valid professional license to practice in all these countries as well as with a verification report for those licenses & experiences.
- Experience with Pharmaceutical Marketing Agencies or sales representatives is not acceptable for all categories.

PROFESSIONAL LICENSE AND CERTIFICATE OF GOOD STANDING

- The applicant must be registered and have a valid professional license to practice, or registration from their home country and /or country of last employment.
- Licensing/Registration validity (where applicable) must cover the minimum experience required for the applied category.

Certificate of Good Standing (CGS) must meet the following requirements:

- Valid and not older than six (6) months at the time of application for licensure.
- Issued by the professional regulatory and licensing authority in the country(s) of last employment.
- NHRA may request more evidence or conduct investigations if deemed necessary to prove the status of good conduct of the healthcare professional.

- The applicant must declare that he/she has never been convicted any legal cases, or medical malpractice during his/her practice in the healthcare profession, or that he/she is currently under investigation.

PRIMARY SOURCE VERIFICATION

The documents required for licensing shall be verified directly from the original or primary source.

These documents include: -

- Educational qualification(s)
- Experience certificate(s)
- Professional license(s)
- Good Standing certificate (CGS)
- Any other documents deemed necessary by NHRA

BAHRAIN PHARMACY LICENSURE EXAMINATION (BPLE)

1. All pharmacy professional applicants must pass NHRA's BPLE in order to obtain a professional license in the Kingdom of Bahrain.
2. The validity of the licensure examination is five years only. If the applicant did not practice within five years, he/ she needs to repeat the exam.
3. Pharmacy professionals have a total of four examination attempts provided following conditions are adhered to:

Each applicant may attempt the examination four consecutive times provided the attempts are done within a maximum of three years from the date of the first attempt.

RENEWAL OF LICENSES

- All pharmacy professionals must submit a minimum of 25 CPD hours annually.
- CPD must be relevant to the field of the specialty/area of practice of the healthcare professional. Furthermore, please note the following:
 1. For CPD events inside the kingdom, only those activities recognized and accredited by NHRA will be accepted.
 2. For CPD events outside the Kingdom of Bahrain will be accepted only if they are issued by the concerned recognized bodies in that country /or accredited by the Authority in that country.
- No CPD activities performed by pharmaceutical companies will be recognized.

- CPD hours should be submitted annually to NHRA even if the license is renewed for two years or more.
- License can be renewed up to a maximum of four years each time.
- A health fitness certificate is required every three years & not done more than SIX months from the date of the renewal application.
- Applicants Can submit a license renewal application two months prior to the expiry date of their current licenses.
- If the professional does not achieve the required CPD target for each year, the renewal application will be pending for 6 months from the date of the requirements until the CPD target is completed and the application will be rejected after 6 months, and the professional must submit a new renewal application.

(Qualification and experience required for BPLE are given in the following page)

QUALIFICATION AND EXPERIENCE REQUIRED FOR BPLE

Title	Qualification	Experience	Qualifying Exam
Pharmacist	Bachelor (BSc) of/ in Pharmacy Pharm.D	Five years of experiences post certification as a pharmacist with a valid license for non-Bahraini	Prometric
	Pharm.D	Two years of experiences post certification as a pharmacist with a valid license for non-Bahrainis	
Clinical Pharmacist	Pharm.D Six-year degree inclusive of (Five years of academic study and One year of internship or residence in a hospital as part of the curriculum	Two years of experience post certification as a clinical pharmacist in a hospital setting with a valid license for non-Bahrainis	Prometric
	M.Pharm degree	Two years of experience postcertification as a clinical pharmacist in a hospital setting with a valid license for non-Bahrainis	
Pharmacy Technician	Diploma in Pharmacy	Minimum of three years of experience post certification as Pharmacy Technician with a valid license for non- Bahrainis	Prometric

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S **WORLD PHARMACISTS DAY- 2024**

September 25th is observed as WORLD PHARMACIST DAY every year.

It is in 2009 that the World Pharmacist Day was first observed by the International Pharmacist Federation Council. International Pharmacist Federation Council was founded on 25th Sept in the year 1912 and that is why September 25th is chosen to celebrate WORLD PHARMACIST DAY. Every year a particular theme is selected by

the IPFO to celebrate this day. This year the theme is "PHARMACIST MEETING GLOBAL HEALTH NEEDS". In a way it emphasizes that PHARMACISTS are a vital part of the Global Health System.

In India World Pharmacists Day was first celebrated in 2013 at Sirifort Auditorium, New Delhi. It was Dr. Viswas Mehta IAS, the former Chief Secretary of Kerala, who inaugurated the first World Pharmacist Day in India I am proud to state here that I could represent Kerala in the first inaugural meeting.

This write up tries to examine in detail the theme, so as to establish how the subjects of the Pharmacy course are important in making PHARMACISTS across the globe a quintessential part of the health care system.

PHARMACY EDUCATION IN INDIA

It was Mahadeva Lal Schroff (ML SCHROFF) who initiated the pharmacy education in India. He is better known as the " Father of Pharmacy Education "and is also the first Pharmacist in India.

India has the unique distinction of having the first pharmacy College in Asia , started in .Goa in 1842 by the Portugese.

Later, a three year B.Pharm course was started as a Department at Banaras Hindu University in 1932 by Prof M L SCHROFF . Subsequently College of Pharmacy were started in Banaras Hindu University in 1937, followed by BITS PILANI and



Adv. MK Unnikrishna Panicker MK
MPharm,LLM,MA(2),PGDJ,PGDESD,CCHR
Former Senior Drugs Inspector,
Drugs Control Dept., Govt.of Kerala

This write up tries to examine in detail the theme, so as to establish how the subjects of the Pharmacy course are important in making PHARMACISTS across the globe a quintessential part of the health care system.

SAGAR University.

In Kerala B.Pharm course was started in Trivandrum Medical College in the year 1967, with only 25 seats under the initiative of Dr. Thankavelu, the then Principal.

Now there are more than 40 colleges under the Kerala University of Health Sciences (KUHS) conducting B.Pharm, M.Pharm, and Pharm.D courses. Each college has an

intake of 60 seats for B. Pharm every year. Besides, several colleges are also conducting two year D.Pharm course.

B.PHARM

B.Pharm is a four year integrated course covering the medical subjects of Anatomy, Physiology, Biochemistry, and Microbiology which are taught in the first year and the core subjects of Pharmaceutical Chemistry, Pharmacology, Pharmacognosy, Dispensing Pharmacy, Pharmaceutics, Medicinal Chemistry and Forensic Pharmacy, in the remaining three years of the course. The course also covers knowledge in Pharmaceutical Engineering and Accountancy Knowledge in each of these subjects is vital in the manufacture of drugs meant for human and veterinary use.

B.PHARM(AYURVEDA) is also conducted under Kerala University of Health Sciences.

PHARMACISTS AND TEACHING

It goes without saying that the service rendered by PHARMACISTS in the various Pharmacy Colleges

as teachers forms the cornerstone of PHARMACY EDUCATION in our country. It is the teachers who really equip the students to take up the various responsibilities of Pharmacists described below. Teachers are the backbone of the Pharmacy Education in India

PHARMACIST AND RESEARCH

Research for a drug requires knowledge of Pharmacognosy, Pharmaceutical Chemistry, Pharmacology and Pharmaceutics.

Identification, evaluation and synthesis of the drug molecule is carried out by qualified Pharmacists. Inventing the medicinal effect of the substance in the human body is the crucial step in the research program. Normally a drug is developed after years of research.

It is worth noting that pharmacists in India developed the vaccine for Covid in record time and as a result India could supply vaccines to many other countries. No doubt, as pointed out by former President, Dr A.P. J Abdul Kalam, India is regarded as the PHARMACY of THE WORLD.

Pharmacologists evaluate the activity by administering the suitable form of the purported drug in animals like mice, rabbit, dogs etc. as tissues of these animals are comparable to that of man. Through these studies they find the dose (minimum quantity required to elicit the expected medicinal effect of the drug in human body) of the drug.

Once this is achieved, the next step is to manufacture the drug. Pharmacists use their knowledge of PHARMACEUTICS to convert the medicinal substance into a form in which it can be administered to a patient.

PHARMACISTS AND DRUG MANUFACTURE

The Pharmacist proceeds to manufacture the drug in a form in which it can be administered to a patient. Drugs are made in the form of Tablets, Oral Liquids, Capsules, Drops, Inhalers, Ointments, Suppositories, Powders, Emulsions, Lotions, Injectables etc.

Drugs are manufactured using modern machineries, mostly in a closed system mode.

Now a days Artificial Intelligence tools are also applied in the manufacture of drugs, thereby reducing man power requirements.

PHARMACISTS AND CLINICAL TRIALS

Once a new drug is manufactured, the same is subjected to CLINICAL TRIALS.

Clinical Trials are done jointly by the Doctor, Pharmacist and the firm who intends to manufacture the drug. Clinical Trials are done on randomly selected patients who are suffering from the disease for which the drug is believed to be effective. Through clinical trials, side effects, adverse drug reactions if any, are also detected. A detailed report of the clinical trial is prepared, which later appears in the literature of the drug. If the drug passes all the four phases of clinical trial, the firm or company has to apply for approval by the Central Drugs Standard Control Organization (CDSCO). Only after such approval the drug can be manufactured in the designated dose and form for use in human beings.

PHARMACIST AND PLANT KINGDOM

The subject of PHARMACOGNOSY in BPharm is centered round the PLANT KINGDOM. The abundant source of medicinal plants in nature are a repository for Pharmacists in identifying new molecules of drug and such research usually form a part of their Doctoral program also.

PHARMACISTS AND DISPENSING OF MEDICINES

During and after treatment of a patient, it is the Pharmacist who serves the medicines with the directions for its use. This process is known as DISPENSING. Counseling is also a part of Dispensing. Pharmacists are able to curb Self medication and also promotes Rational Use of Drugs by adopting ethics in Dispensing.

In India most of the Pharmacists qualified with D.Pharm accomplishes this job. These Pharmacists ought to be registered with the respective State Pharmacy Council.

PHARMACISTS AND PHARMACY PRACTICE

Pharmacists qualified with M.Pharm (Pharmacy Practice) or Pharm.D, scrutinizes the medicines prescribed by the Doctor before it is dispensed for inpatients or out patients. They are advising the Doctor on the side effects, drug-drug interactions, drug-food interactions and also of probable adverse reactions. This helps the doctor to prescribe only the right medicines to suit the patient. This ensures safety of patients and also

brings down cost of treatment. As pointed out earlier, the intervention of Pharmacists help to promote RATIONAL USE OF DRUGS.

In developed countries Pharmacy Practice is followed in all hospitals. It is a bliss that such pharmacy Practice system is gradually gaining momentum in India too.

PHARMACISTS AND DRUG DISTRIBUTION

Other than dispensing medicines to patients in hospital, Registered Pharmacists are also engaged in dispensing prescriptions through Licensed medical stores.

Most drugs are dispensed by observing the Drugs and Cosmetics Rules 1945. Pharmacists counsel the patients to store the medicines at the prescribed conditions in order to preserve the quality of the drug. Pharmacists also ensure proper storage of drugs stocked in wholesale outlets and hospitals and Blood Banks.

Pharmacists are able to prevent. Self-medication by properly counselling the patients.

PHARMACISTS AND MEDICAL DETAILING

PHARMACISTS also appraise the doctors about the medicines on behalf of the firms which manufacture drugs and thus promote the ethical distribution of drugs.

PHARMACISTS AND DRUG LAWS

It was in 1940 that the Drugs and Cosmetics Act was enacted to regulate the manufacture, Distribution and Sale of Drugs in India. Drugs and Cosmetics Rules 1945 was framed to help the proper enforcement of the provisions of the above Act. As per the Act license for manufacture and analysis of drugs, license for storing and Distribution of drugs, license for Blood Banks, License for manufacture of Cosmetics are issued by the Central and/ or State Drugs Control Authorities, as the case may be. Graduate level Pharmacists are working in these Regulatory bodies. It is the knowledge of Forensic Pharmacy which equips them to do this job effectively.

PHARMACISTS AND DRUG TESTING

As per rules, medicines manufactured by firms are to be tested for quality in the laboratories attached to the firm. Samples drawn by enforcement officers are tested in Govt. Drug Testing Laboratories to ensure quality of medicines in

circulation. It is the knowledge of Modern Analytical Pharmaceutical Chemistry that enable the Pharmacists to conduct the required tests as prescribed in the respective Pharmacopoeas. subsequently the Govt Analyst issues reports of testing of drugs drawn by the enforcement officers. The law requires that Pharmacists duly qualified are to be appointed separately, for both manufacture and testing in firms and this is a condition of license. Likewise in Govt. Drug Testing Laboratories, pharmacists qualified as per law are appointed for testing of drugs and cosmetics.

Thus it can be seen that the Pharmacists are totally responsible for the drug manufacture, Testing, and distribution.

PHARMACISTS AND VETERINARY MEDICINES

Pharmacists are also involved in the manufacture and testing of veterinary medicines.

HEALTHY NATION

Health is the Wealth of a Nation. That is why many countries are earmarking a sizeable allocation in the annual Budget of their nation, for Health.

In India Health is a concurrent subject. Both Central and State Governments handle health related matters. During Covid time the services of Pharmacists were utilized by certain States to treat minor ailments, which in a way reduced the work load of doctors.

HONOURING AND RECOGNISING PHARMACISTS

WORLD PHARMACISTS DAY is also intended to honour and recognise the valuable services rendered by PHARMACISTS.

In this context it is worth noting the services rendered by late **Dr. Muhammad Majeed**, an alumni of the Trivandrum Medical College. After passing BPharm he could establish his Pharmaceutical business both in US and India, almost at the same time.

He is also known as the Father of Neutraceuticals. He holds the maximum number of Patents in the domain of Pharmacy. i.e, 500+. He established SABINSA CORPORATION and SAMI labs in US and India respectively. 2024 is the year in which Dr. Majeed left us. Dr. Majeed was born on September 25th, 1948. Because of this, the pharmacy fraternity in KERALA dedicate this years' PHARMACISTS DAY to Dr. Majeed, on his birthday.

From what has been described above the reader could understand how significant is the role of PHARMACISTS in the health care system to meet the Global health needs.

The author was a former Senior Drug Inspector at the Drugs Control Department, Government of Kerala; Principal at Ezhuthachan College of Pharmacy, Neyyattinkara; and Director of the School of Medical Education at MG University, Kottayam. He has also served as a member of the Permanent Lok Adalat and the Pharmacy Council of India.

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Procrastination means delaying or postponing something that needs to be done usually because it's unpleasant or dull. By procrastinating you can damage your performance, harm your reputation, and cause yourself unnecessary anxiety. It is often confused with laziness, but they are very different. Procrastination is an active process – you choose to do something else instead of the task that you know you should be doing. In contrast laziness suggests apathy, inactivity and an unwillingness to act.

Procrastination usually involves ignoring an unpleasant, but likely more important task, in favour of one that is more enjoyable or easier. It may relieve pressure in the moment, but it can have steep emotional, physical, and practical costs. Students who routinely procrastinate tend to get lower grades, workers who procrastinate produce lower-quality work, and in general, habitual procrastinators can experience reduced well-being. If we procrastinate over a long period of time, we can become demotivated and disillusioned with our work, which can lead to depression and even job loss, in extreme cases.

People procrastinate because of many reasons such as those listed below:

- a) The task is too long, complicated, boring, not important or not likeable
- b) They prefer to choose doing their own pleasurable activities
- c) They are too over-confident and believe that they have enough time or the competency to complete the task
- d) They have a 'care less' attitude and always believe that nothing bad will happen if they hand in late work and that people will always forgive them
- e) They do it due to peer pressure as they fear being mocked or ridiculed if they turn in their work early
- f) They procrastinate due to nothing else but pure laziness

The Perils of Procrastination

Postponing doing something is detrimental to yourself as well as others. It wastes your time and that of others. Why others? Because we are living in an interconnected world. Whatever we do will always affect others in one way or another. The repercussions of your procrastination will not only hurt you but will cause a ripple effect to other

PROCRASTINATION- Perils and how to overcome it ?



Dr. Kala D

Principal,
Sree Gokulam SNGM College of Pharmacy,
Thuravoor, Alappuzha

Procrastination is a debilitating illness that can rob you of your success both in studies and in career. It's always better to err on the side of caution than to regret for the rest of your life. Starting work early will not cost you anything but rather can help you in doing your job better and more efficiently

things or people around you. For a student, missing deadlines for assignments or being late studying for exams can lead to bad grades and even failures. When you fail, you either have to repeat your year of study or retake the examination. This could add more to your already long list of tasks that you need to complete. Not only time is wasted, but also money and resources. Even if you don't fail, doing last-minute work could result in low-quality work, resulting in a lower grade than you are capable of. Those poor grades will definitely not look good on your testimonials. But what's worse is that your poor grades can demoralise you or affect your parents, and other family members. For an employee, procrastination can also lead to missed deadlines or sloppy work. Procrastination will do you more harm than good as you are putting yourself under undue stress and pressure.

In fact, your substandard work may just cause your company to lose profits or important business

deals. This is definitely an unforgiveable act and could very well jeopardise your career. Doing things last minute can cause you a lot of stress. Procrastination is a stress because it often causes you to cram at the last minute. Stress affects your ability to think properly, remember things, process new information or be creative and critical. When stress and anxiety attack you, you are mentally exhausted, and you will be easily distracted and prone to making costly and even harmful mistakes in your job. Stress can also cause a host of other symptoms like headaches, sleep disorders, vision problems, cardiovascular, gastrointestinal and musculoskeletal systems, to name but a few. Taking a few days leave to finish your work will not solve your problems as your pending work will accumulate during your absence and generates even more stress when you return.

Top 5 Tips to Stop Procrastination

- a. Start small. Break large tasks into smaller chunks, and pick one that you can do now – so that you're underway almost without realizing it!
- b. Make a plan. Put times or dates on the key tasks on your list, so that you know what to concentrate on and when.
- c. Finish things. When you spot a task that's nearly done, put extra effort into getting it over the line.
Don't be tempted to leave lots of jobs almost finished enjoy the satisfaction of ticking them off your list!
- d. Deal with distractions. What can you change about your environment to improve your focus? What needs to be put out of reach until this task is done?
- e. Be kind to yourself. No one ever gets to the end of their to-do list! Do your best to meet your deadlines, and celebrate your successes. But be realistic: you'll always have more to do than there are hours in the day.

Conclusion

Procrastination is a debilitating illness that can rob you of your success both in studies and in your career. It's always better to err on the side of caution than to regret for the rest of your life. Starting work early will not cost you anything but rather can help you in doing your job better and more efficiently. Submitting an assignment or job before the due date may give you chance to

re-modify your work based on feedback from youteacher or supervisor. People can forgive you better if you allow them time to make suggestions for corrections than if you cause them more problems due to your mediocre work. Dilatory work does not benefit anyone and in fact could harm everyone. If something needs to be done, even if the deadline is still far away, it is best to act quickly to accomplish it. This will not only lessen the number of tasks that you have to complete, it will also de-escalate your worries.

(Concept from Eat that Frog by Brian Tracy)

Activities & News



Mr. Abdul Nazeer PU
Gen. Secretary, KPGA

It gives me immense pleasure to present the activity report of KPGA for 2024–2025.

1. Annual General Body Meeting 2024

The annual general body meeting of KPGA for the year 2024 was conducted on 4th August 2024, 10 am at KPGA Bhavan, Thiruvananthapuram. Program started with prayer song followed by welcome speech by Mr. Mathew Kokkad, KPGA executive member. Thereafter Dr. C. R. Sudhakaran Nair delivered a condolence speech as a tribute to Dr Mohammed Majeed. Dr P K Sreekumar, President of KPGA presided over the meeting. As KPGA general secretary, Sri Abdul Nazeer couldn't attend the meeting due to some health issues, Ms Sangeetha R, Joint Secretary of KPGA presented the Annual report for the year 2023- 24 and minutes of last GB. Treasurer Mr. Sunil Kumar D presented the audited financial report.

Dr. Kala D, Vice President KPGA and Chairperson- Student project scheme presented the report on student funding. After lunch break, general discussion was conducted and the programme concluded with vote of thanks by Ms. Sangeetha R.

2. National Symposium 24

Sreekrishna College of Pharmacy and Research Centre (SKCPRC) in association with KPGA conducted a National Symposium with the theme 'Mastering the art of learning Pharmacy laws and important amendments' on 6th August, 2024. Chief guest and resource person of the program was PK Sreekumar, President, KPGA, who delivered a wonderful speech on the topic 'Latest amendments of Drugs and cosmetic acts' followed by discussions. The second session started on the topic 'Artificial Intelligence-Impact on contemporary drug research and Pharmaceutical formulations' which was led by Dr. Daniel Xavier Prasad, Dept. of Pharmacognosy, SKCPRC. The programme concluded with the speech of Dr. Prasobh, Principal, SKCPRC.

3. Independence Day Celebration on August 15, 2024

KPGA student's wing conducted an online program on August 15 at 11.00 AM in connection with Independence Day Celebration. The program started with a prayer song by Ms. Namitha KN (Associate Professor, ECPS). Welcome address was delivered by Ms. Aathira RS (Pharmacy tutor, Hyderabad) and presided by Prof. Pankajakshy (Rtd Principal, Dale view College of Pharmacy). The programme was anchored by Ms. Saranya. T R and Anitha K, Assistant Professors, Sree Gokulam SNGM College of Pharmacy.

The Independence Day message was delivered by Prof. SM Sandhya (HoD, Pharmaceutical Chemistry Dept, ECPS). Students wing members of KPGA Mr. Aswin S (Dale View College of Pharmacy) and Ms. Mary Jinsha (Sree Gokulam SNGM College of Pharmacy) were given Independence day speech followed by musical performances by Ms. Mridula Madhu (SreeGokulam SNGM College of Pharmacy), Ms. Sivani (Dale View college of Pharmacy), Ms. Phoeba Sara Cherian (CPS, Kottayam). Vote of thanks was proposed by Ms. Shanthi Nair (Vice Principal, Sree Gokulam SNGM College of Pharmacy). The Program came to an end with National anthem.

Obituary



We are deeply saddened by the sudden demise of our esteemed former President of Kerala Pharmacy Graduates' Association, beloved Shri. Sali H, on 03/10/2024. He was a simple and humble person who always led with kindness and dedication. His contributions to the pharmacy community will always be remembered and may his legacy continue to inspire us. Our heartfelt condolences go out to his family and loved ones.

Ph.D Awards



Dr. Anupriya Mahesh, Associate Professor, Department of Pharmaceutics, Lisie College of Pharmacy, Ernakulam, achieved a significant milestone by being awarded a Ph.D. in Pharmaceutical Sciences from JJT University, Rajasthan, India. Dr. Anupriya is a proud member of the Kerala Pharmacy Graduates' Association. Congratulations on your academic achievement.



Dr. Sowparnika Treasa Sabu, Scientist-III at the Indian Council of Medical Research (ICMR) Headquarters in New Delhi, Associate Editor of Pharmline, and a dedicated member and supporter of KPGA, has been conferred a Ph.D. in Pharmaceutical Sciences with an area of expertise in Clinical Pharmacy. Congratulations on your scholarly accomplishment.

Upcoming Event

The second Kerala Pharmaceutical Congress (**KPC-2025**) will be held on 21 & 22 February-2025. This event will bring together industry leaders, educators, researchers, Clinical Pharmacists and students to explore the dynamic impact of AI and emerging technologies on Pharmaceutical education and the Industry. Hosted at the Caritas College of Pharmacy, Kottayam, this two day event will delve into how advancements in AI are reshaping drug discovery, patient care, educational methods, fostering innovation and driving progress in Pharmacy. Join us in this unique opportunity to connect, collaborate, and stay ahead in an ever-evolving field.

KPGA
Kerala Pharmacy Graduates' Association

CARITAS
COLLEGE OF PHARMACY

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KPC-2025
KERALA PHARMACEUTICAL CONGRESS
2025 February 21 & 22

Theme:
**AI and Emerging Technologies :
Transforming Pharmacy Education & Industry**

-  **Scientific sessions**
• Research Initiatives
-  **Knowledge exchange**
• Meaningful discussions
-  **Build lasting connections**
• Join with global leaders
-  **Honouring Legends**
• Unlocking opportunities in Academia, Industry, Clinical Pharmacy & R&D

The Second Kerala Pharmaceutical Congress brings together industry leaders, educators, researchers, Clinical Pharmacists and students to explore the dynamic impact of AI and emerging technologies on Pharmaceutical education and the Industry. Hosted at the Caritas College of Pharmacy, Kottayam, this two day event will delve into how advancements in AI are reshaping drug discovery, patient care, educational methods, fostering innovation and driving progress. Join us in this unique opportunity to connect, collaborate, and stay ahead in an ever-evolving field.

Call Us: +91 9745014772 | Visit Our Website: www.kpga.in | Venue: CARITAS COLLEGE OF PHARMACY, Ettumanoor, Kottayam



GALLERY

Annual General Body Meeting- 2024
Thiruvananthapuram On 04/08/2024





GALLERY

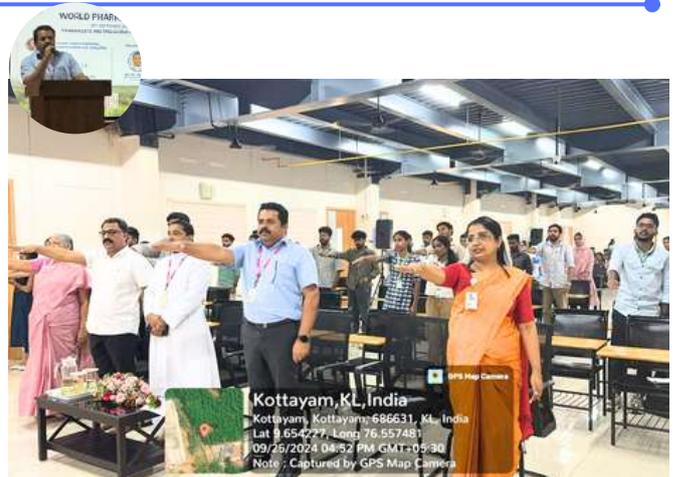
WORLD PHARMACISTS DAY- 2024



Sree Krishna College of Pharmacy & Research Centre, TVM



WPD celebratons Street play by Dr. Joseph Marthoma Institute of Pharm.Sciences, Kattanam



WPD celebratons at Caritas College of Pharmacy, Kottayam



WPD celebratons at Sree Gokulam SNGM College of Pharmacy, Thuravoor



WPD celebratons at Ezhuthachan College of Pharmacy, Tvm



GALLERY

5 Days offline Faculty Development Program at St. Joseph's College of Pharmacy, Cherthala jointly with Kerala State Higher Education Council in August, 2024



Cherthala, Kerala, India
St. Joseph's College of Pharmacy, Dharmagiri College Campus, Naipunnya Road, Kuruppan Kulangara, Cherthala, Kerala 688524, India
Lat 9.697006°
Long 76.330576°
31/07/24 01:06 PM GMT +05:30

Emerging Trends in Pharmacy: A Glimpse into the Future
One Day Seminar at National College of Pharmacy, Kozhikode on 18/10/2024



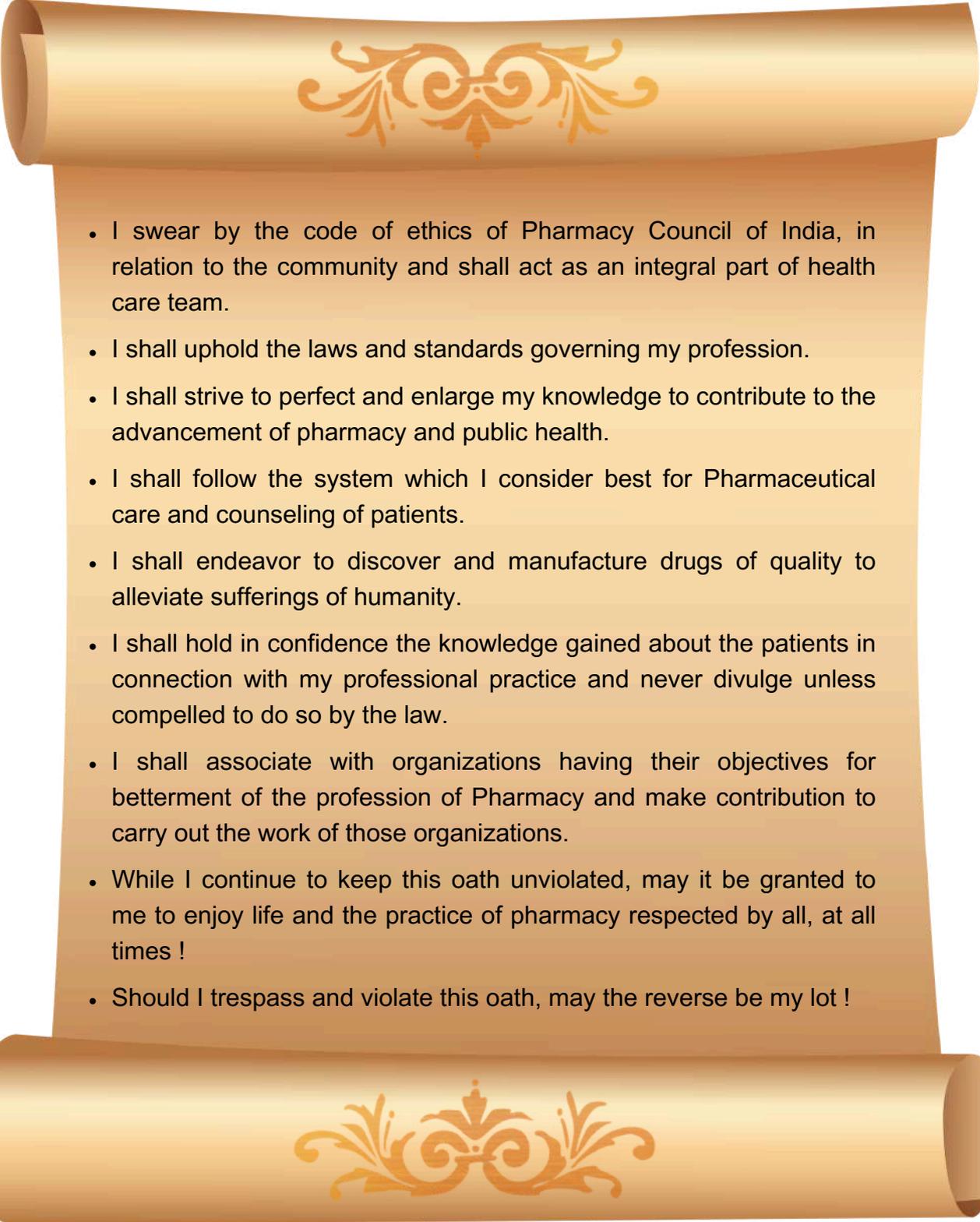
Award for Excellence



Dr. Shiji Kumar, Principal, Dale View College of Pharmacy, Tvm (Executive Member of KPGA) received 'Outstanding Pharmacy College in promoting Research & Innovation' Award from Hon. Minister for Information Technology & Digital Services, Dr. Palanivel Thiagarajan, Govt. of Tamil Nadu



Pharmacist's Oath

- 
- I swear by the code of ethics of Pharmacy Council of India, in relation to the community and shall act as an integral part of health care team.
 - I shall uphold the laws and standards governing my profession.
 - I shall strive to perfect and enlarge my knowledge to contribute to the advancement of pharmacy and public health.
 - I shall follow the system which I consider best for Pharmaceutical care and counseling of patients.
 - I shall endeavor to discover and manufacture drugs of quality to alleviate sufferings of humanity.
 - I shall hold in confidence the knowledge gained about the patients in connection with my professional practice and never divulge unless compelled to do so by the law.
 - I shall associate with organizations having their objectives for betterment of the profession of Pharmacy and make contribution to carry out the work of those organizations.
 - While I continue to keep this oath unviolated, may it be granted to me to enjoy life and the practice of pharmacy respected by all, at all times !
 - Should I trespass and violate this oath, may the reverse be my lot !

PHARMLINE

The Official Publication of Kerala Pharmacy Graduates' Association

PHARMLINE is the official publication of KPGA and is published since 1981. It is a tri annual publication. The main aim of the publication is to keep Pharmacists informed on current issues and best practices, as well as serving as a platform for the exchange of ideas, knowledge and opinion among Pharmacists and related disciplines. The Publishers welcome contributions of Pharmaceutical relevance. Original articles are considered for publication on the condition that they have not been published, accepted or submitted for publication elsewhere. The Editors reserves the right to edit manuscripts to fit articles with in space available and to ensure conciseness, clarity and stylistic consistency. All scientific articles submitted for publication are subject to a double-blind review procedure.

Please send your articles to kpgapharmline@gmail.com

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Published by Dr. PK Sreekumar on behalf of the Kerala Pharmacy Graduates' Association



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