

INNOVATION - RESEARCH - INSPIRATION

PHARMASPIRIT

JULY
2024

ISSUE IV



POKHARA UNIVERSITY STUDENTS' PHARMA ASSOCIATION

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MESSAGE FROM DEAN



POKHARA UNIVERSITY
पोखरा विश्वविद्यालय
FACULTY OF HEALTH SCIENCES
स्वास्थ्य विज्ञान संकाय
Office of the Dean



चलानी नं./Ref. No.:

It is with great pleasure that I extend my congratulations to the Pokhara University Student's Pharma Association (PUSPA) on the publication of another edition of Pharmaspirit.

This edition of Pharmaspirit, I am confident, will provide up-to-date professional and academic information to our readers. It is through such exploration and knowledge sharing that we can collectively elevate the pharmacy profession and contribute meaningfully to the well-being of our communities.

The field of pharmaceutical sciences is constantly evolving, and PUSPA has demonstrated a strong dedication to keeping up with these advancements. For the last two decades, PUSPA has served as a platform where every student has the opportunity to grow their professional network. Conducting and participating in multiple activities, PUSPA fosters a culture of professionalism, ethics, and social responsibility among aspiring pharmacists.

I have high hopes that PUSPA will keep achieving its mission and reach even greater heights in the future.

Finally, on behalf of the entire Faculty of Health Sciences, I commend the Pharmaspirit team for their continued efforts and dedication.

I extend my best wishes to the entire member of PUSPA, for the continue growth and success.

Regards,

Dr. Amar Nagila
Dean, Faculty of Health Sciences



Dr. Amar Nagila
Dean,
Faculty of Health
Science



MESSAGE FROM DIRECTOR



Pokhara University
Faculty of Health Sciences
SCHOOL OF HEALTH AND ALLIED SCIENCES
Pokhara-30, Kaski

Ref. No.:

Greetings Everyone!

It is with great pride and enthusiasm that I extend my warmest greetings to you all. The director of School of Health and Allied Sciences would like to welcome you all to this new edition of Pharnaspirit and show sincere thanks to share my views.

Pharmacy is a diverse and dynamic field that integrates health sciences with chemical sciences to ensure the safe and effective use of medications. As a critical component of the healthcare system, pharmacy encompasses a wide range of practices and disciplines aimed at improving patient health outcomes through the optimal use of medications. At Pokhara University, we are committed to advancing the field of pharmacy through a combination of rigorous academic programs, cutting-edge research, and a deep dedication to patient care. Our mission is to educate the next generation of pharmacists, researchers, and healthcare leaders who will make a significant impact on public health and well-being.

PUSPA continues to be a beacon of excellence in education, research, and community service, thanks to the dedication and hard work of our exceptional students. PUSPA has shown remarkable dedication and innovation, excelling in their studies and actively participating in groundbreaking projects. So, I would like to congratulate PUSPA for their astonishing achievement and I hope you will be inspired by this publication.

At the end, I extend my best wishes to all of you.

Regards,

Bimala Bhatta
Director, Faculty of Health Sciences



Bimala Bhatta
Director,
Faculty of Health
Science

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MESSAGE FROM CO-ORDINATOR



Sangam Subedi
BPharm Coordinator
SHAS, PU

Pokhara University Students Pharmacy Association (PUSPA) is one of the most profound student clubs at Pokhara University and has always focused on professional development. It represents unity, teamwork, and advocacy. Moreover, PUSPA is a major platform for overall personal growth. It offers chances for networking, sharing knowledge, and developing skills, helping our students become caring and skilled pharmacists.

I am very happy to know that PUSPA is publishing a new issue of Pharmaspirit. I believe this issue will include updated professional and scientific information. I hope the magazine will show the creative talents of our students. Pharmacy is always changing, and I am sure the content in this magazine will show the variety and depth of our field.

I wish you all the best in your future efforts.



MESSAGE FROM CO-ORDINATOR



Punam Gauchan
MPharm Coordinator
SHAS, PU

I am very delighted to know that the Pokhara University Students Pharma Association (PUSPA) is releasing the fourth edition of Pharmaspirit. I would like to take this opportunity to congratulate the entire team for this achievement. I am sure this edition will include updated professional and scientific information. As always, I am very pleased to see our young and future pharmacy workforce actively getting involved and thriving in professional development.

PUSPA is an organization that keeps evolving to help students connect both professionally and socially. It has been promoting unity and helping everyone work as a team. As students of pharmaceutical sciences, it is important to stay updated on the ever-evolving changes in this field. I believe Pharmaspirit will provide the latest information and updates in this edition too.

I wish you all the best for your future endeavors.



MESSAGE FROM PRESIDENT



Suraj Paudel
President, PUSPA

As the President of the Pokhara University Students' Pharma Association, it is my honour to connect with you through this message. Our organisation is dedicated to fostering professional growth, community service, and academic excellence in the field of pharmacy.

Our flagship initiative, PharmaTalk, enables students and professionals to share insights and explore pharmaceutical innovations. We also host workshops to enhance practical skills, and our annual PharmaMUN event offers a unique forum for discussing health policies. Committed to community service, we run cleanliness programmes and impactful school health programmes in local schools.

I would like to extend my heartfelt gratitude to our faculty advisors, professors, and all members of the Pokhara University Students' Pharma Association for their unwavering support and active participation. Your dedication and enthusiasm are the driving forces behind our success.

Thank you for your commitment and passion. Let us strive for excellence and make a positive impact through our collective efforts.



MESSAGE FROM ADVISOR



Dhurba Singh Thakuri
MPharm (Clinical Pharmacy)

Pokhara University Students' Pharma Association, PUSPA, has consistently served as a platform that embodies the spirit, dedication and unity of pharmacy students. Serving as an advisor for PUSPA has been an incredible honour, and I'm proud of how the organization actively promotes the professional and personal growth of pharmacy students. Moreover, I believe that this magazine will function as a wonderful platform for everyone to learn about the most recent advancements in pharmaceutical science as well as to share experiences, information, and insights. May this magazine continue to inspire, educate, and inform.

Wishing everyone the very best in all your upcoming endeavours!



MESSAGE FROM ADVISOR



Sandesh Poudel
MPharm (NPC)

As we reflect on another remarkable year at PUSPA, I extend my heartfelt gratitude to each of you for your unwavering dedication and passion. This past year has been challenging yet rewarding, marked by numerous achievements and memorable events that have strengthened our bond as a society. Your creativity, leadership, and teamwork have been instrumental in shaping our successes and overcoming obstacles together. As we look ahead, I am confident that PUSPA will continue to flourish under your capable stewardship. Your energy and innovative spirit ensure that our society remains a dynamic hub for learning, growth, and friendship.

I extend my best wishes to all members, both past and present. May your futures be bright, filled with continued success and fulfillment. Thank you once again for your remarkable contributions, and here's to another fantastic year ahead!



EDITOR'S NOTE

Greetings, readers!

We are thrilled to present the fourth edition of Pharmaspirit magazine, a publication dedicated to exploring the dynamic world of pharmaceutical sciences.

In today's fast-paced world, staying ahead of the curve is not just a goal—it's a necessity. The purpose of this edition is to provide you with the inspiration and information you need to go on this adventure.

In this edition, we present a variety of articles and creative pieces from students and faculty, along with memoirs about PUSPA and highlights of our organization's activities for 2023/24. We've also included heartwarming messages to the juniors from our seniors. Additionally, we feature exclusive interviews with renowned experts in their respective fields.

We'd like to take a moment to express our genuine gratitude to Mr. Atis Kaundinnyayana and Mr. Kushal Subedi for their unwavering support throughout this journey. Also, we're quite humbled by the support shown by every one of you to make this edition of Pharmaspirit a success.

We hope this edition not only broadens your knowledge but also fills you with pride as a student and future pharmacist.

Regards,
PharmaSpirit Team



PUSPA

POKHARA UNIVERSITY STUDENTS' PHARMA ASSOCIATION

Pokhara University Students' Pharma Association (PUSPA) is an organization of pharmaceutical sciences students at the School of Health and Allied Sciences, Pokhara University. It was established on September 24, 2002, with an aim to disseminate the knowledge of medicine and public health to the general public along with uplifting the role of pharmacists to achieve that purpose.

PUSPA is a non-political and non-profitable organization. The patron of the organization is the Coordinator of Bachelor in Pharmaceutical Sciences program at the School of Health and Allied Sciences, Pokhara University. While the advisors are all the professors of Pharmaceutical Sciences.

Since its establishment, PUSPA has been a pioneer organization of pharmacy students. It has been organizing several offline and online professional and personality development programs like Pharmataalks, Career Conclave, Health camps, Community-based awareness programs, Webinars/Seminars, Workshops, etc. PUSPA has also established a garden named 'PUSPA Garden' in the premises of the School of Health and Allied Sciences with an aim to plant and preserve locally available medicinal plants and herbs.

The objectives of PUSPA includes:

- To establish relationships and maintain communication between the pharmaceutical sciences students of SHAS, Pokhara University with national and international guilds.
- To comprehend the role of pharmacists in the health-care sector to the general public.
- To encourage pharmacists to work as a medicine-specialist morph.
- To play an important role in the reinforcement of the local health-care sector.
- To notify the students about pharmaceutical companies, Non- Governmental Organization (NGO) and International Non-Governmental Organization (INGO) related information.
- To play an important role in preserving and appropriately utilizing locally available herbs and crude drugs.

PUSPA EXECUTIVE COMMITTEE



Suraj Poudel
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Prabesh Koirala
Vice-President



Archana Pantha
Secretary



Swastika Bastola
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Karuna Sigdel
Member



Sobit Baral
Co-ordinator



Samjhana Pandey
Member



Suraksha Bhattarai
Member

THE PHARMASPIRIT TEAM

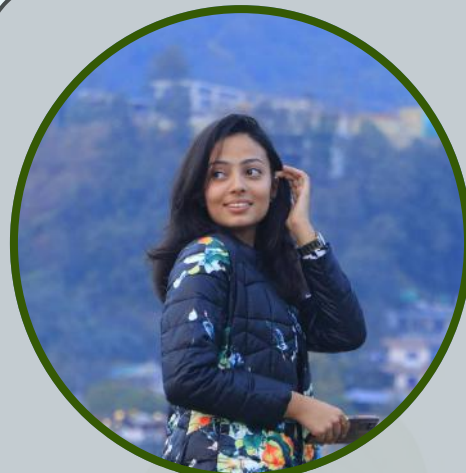
THE CREATIVE FORCE



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Designer head



Satish Yadav
Member



Susam Neupane
Editor-in-Chief



Nabin Dev Baniya
Member



Dipesh Kumar Karn
Member

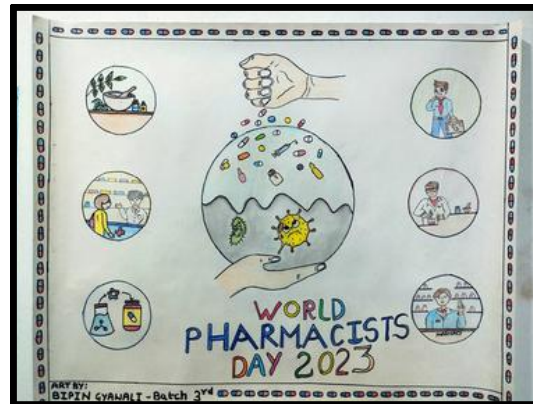


NEWS --- EVENTS

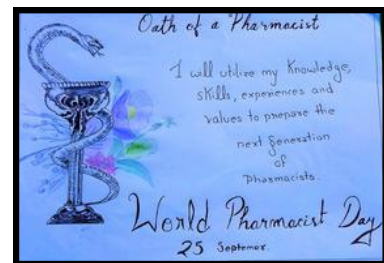
CAPTURING EVERY STEP, CELEBRATING EVERY ACHIEVEMENT



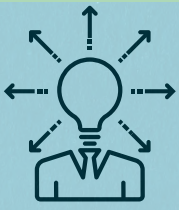
POSTER COMPETITION



First Position



PUSPA conducted an online poster competition on the occasion of International Pharmacists' Day with the theme: "Pharmacist Strengthening Health Systems". The program was a great success with participation from almost all of the universities in Nepal. After careful consideration by a panel of judges, Bipin Gyawali got the first position in this competition.



AWARENESS PROGRAMMES



PUSPA conducted 'Tuberculosis Awareness Sessions' in Samata Sikshya Niketan on March 2 with the motto of 'Together, we can make a positive impact in the fight against TB and build a healthier future!'.



PUSPA conducted an enlightening awareness program at Kalika Secondary School and Samata Shikshya Niketan in honor of World Pharmacy Week where we explored the dynamic field of pharmaceutical sciences and discussed dengue virus, its transmission, symptoms, and crucial prevention strategies



PHARMA TALK



Session- I

Topic: Provision of Civil Service Codes Related to Pharmaceutical Services

Facilitator:

Mr. Dharmendra Neupane



Session- II

Topic: Role of Pharmacist in Pharmaceutical Marketing

Facilitator: Mr. Sabin Raj Shakya



PHARMAMUN 2024



Agenda: "Enhancing Access to Essential Medicines in Low-Income Nations"

Committee: World Health Organization (WHO)

Organized By: Pokhara University Students' Pharma Association (PUSPA)

Supported By: Youth Thinkers' Society - Pokhara, Yashi Labs

The PharmaMUN was a two days long programme conducted on January 19 and 20 in the premises of Horticulture Research Station, Pokhara. The event highlighted on teaching undergraduate students interested in policy making with the idea of diplomacy, international relations and various aspects of organizational leadership.



PHARMAMUN 2024



Expert Session-II: "Essential Medicines Access in Low-Income Nations"

Speaker: Mr. Bijay Tripathi

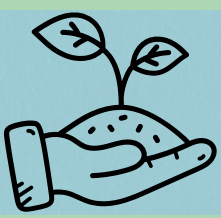


Expert Session-II: "Essential Medicines Access in Low-Income Nations"

Speaker: Mr. Bijay Tripathi

Two 'Expert Sessions' were conducted to help participants understand the current situation of essential medicines and their availability and regulation in various regions throughout the world.

Overall, The PharmaMUN 2024 was a huge success.



PLANTATION PROGRAMME



On the occasion of World Environment Day-2024, the Herbal Committee, PUSPA, organized 'Medicinal Plants Plantation and Cleanliness Program' around the premises of School of Health and Allied Sciences, Pokhara University. 20+ new plants with numerous records on their medicinal uses were planted, prioritizing PUSPA Garden and Natasha Garden.



FAREWELL PROGRAMME



PUSPA, in cooperation with the students of seventh semester organized a farewell programme for the BPharm students Eighteenth Batch.

ORIENTATION AND INTERACTION SESSION



PUSPA conducted an orientation and interaction session with Batch of 2023 to welcome the new members and provide them with essential insights into our organization.



WORKSHOP

TOPIC: Literature Review and Reference Management: A Workshop for Beginners



Mentors: Mr. Sandesh Paudel, Mr. Dhurva Singh Thakuri

Organizer: Herbal Committee, PUSPA

The goal of this workshop was to provide the participants with the knowledge and abilities one needs in order to manage references and read scientific material efficiently.

Social Media Infographics



PUSPA celebrated World Breastfeeding Week from August 1-7, with the theme “Let’s make breastfeeding and work, work!”.

World Suicide Prevention Day (WSPD) is celebrated annually on September 10. With the theme “Creating hope through action” WSPD 2023 reflects the need for collective action to address this urgent public health issue.



World Pharmacists Day



PUSPA celebrated World Pharmacist Day on September 25, with the theme ‘Pharmacy strengthening health system’. An online poster was organized to mark this event.

World Heart Day is observed on September 29 every year to raise awareness about heart diseases. The theme for World Heart Day 2023 was "Use Heart, Know Heart".



Social Media Infographics



PUSPA celebrated 'World Mental Health Day' on October 10. It was dedicated to raising awareness about mental health issues and advocating for the importance of mental well-being.

October 15, marks Global Handwashing Day, a worldwide initiative aimed at raising awareness regarding the significance of handwashing with soap as a cost-effective and efficient method to prevent illnesses and preserve lives.



Each year, on October 20th, World Osteoporosis Day is marked to promote awareness regarding the prevention, diagnosis, and treatment of osteoporosis.



World AIDS Day is celebrated annually on December 1st to raise awareness, honor lives, and advocate for communities leading the fight against HIV/AIDS.

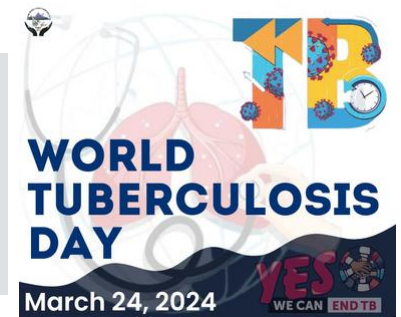


Social Media Infographics



World Cancer Day, held every 4 February, is a global initiative led by the Union for International Cancer Control (UICC).

World Tuberculosis Day is observed annually on March 24th to raise awareness about the global epidemic of tuberculosis (TB) and efforts to eliminate the disease.



International Women's Day is a global observance held annually on March 8 to celebrate the achievements and contributions of women throughout history.

2 April is celebrated as World Autism Awareness Day to highlight the need to help improve the quality of life of those with autism so they can lead full and meaningful lives as an integral part of society.



Social Media Infographics

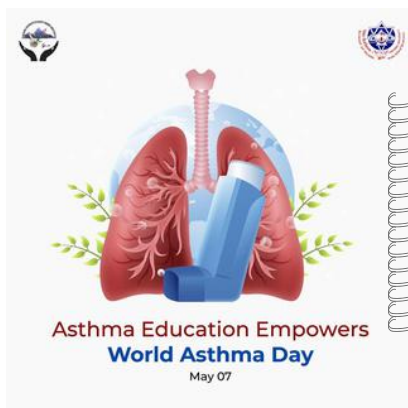


World Malaria Day 2024 was celebrated on April 25 with the theme “Accelerating the fight against malaria for a more equitable world”.

World Hand Hygiene Day is observed on May 5 every year. This global event aims to promote the importance of hand hygiene in preventing the spread of diseases and infections.



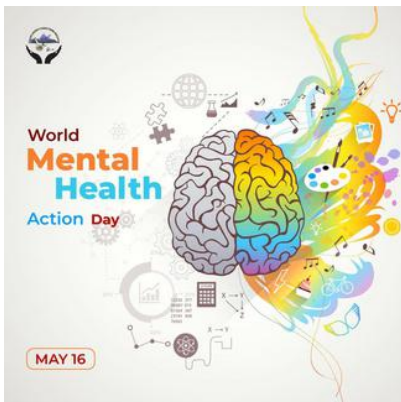
World Asthma Day is a global healthcare event commemorated every year on the first Tuesday in May to promote awareness of asthma worldwide.



World Thalassemia Day is observed on May 8 where we stand together to raise awareness and support for those living with thalassemia.

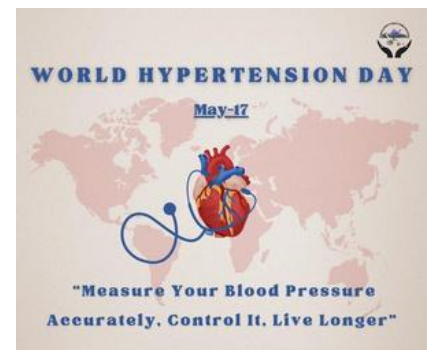


Social Media Infographics



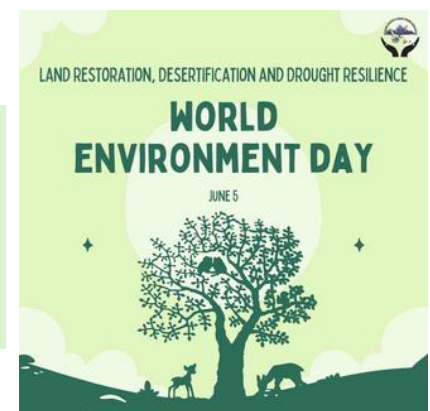
Every year, May 16 is Mental Health Action Day, an annual observance to shift our mental health culture from awareness to action.

World Hypertension Day is celebrated annually on May 17 to educate the public and increase awareness of hypertension.

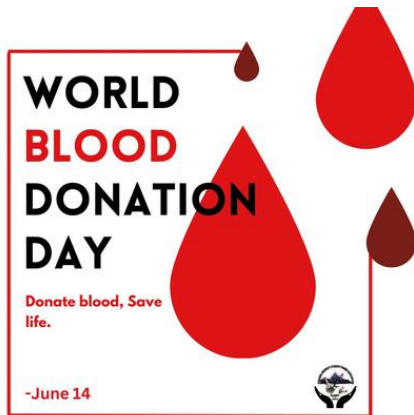


World No Tobacco Day 2024 is observed on May 31 to raise awareness about the dangers of tobacco use and advocate for effective policies to reduce consumption.

PUSPA celebrated World Environment Day on June 5th, to raise awareness and encourage action for the protection of our environment.

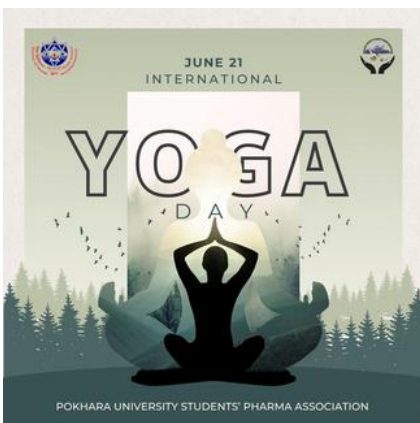


Social Media Infographics



Every year on June 14, the world comes together to celebrate World Blood Donor Day, an occasion dedicated to recognising the critical role of voluntary blood donors.

World Sickle Cell Day celebrated on June 19th, highlights the struggles and resilience of those affected by sickle cell disease.



This year marks the 10th International Day of Yoga, celebrated on June 21, with the theme “Yoga for Self and Society”.

International Day against Drug Abuse and Illicit Trafficking was observed on June 26 to raise awareness about the devastating consequences of drug abuse.



Articles



RESEARCH-REVIEW

Prevalence of Psychoactive Drug Use among Medical Students in a Medical College of Nepal



Amit Yadav
Sixth Semester, BPharm

INTRODUCTION

Psychoactive substances include alcohol, tobacco, licit and illicit drugs, that when consumed, can harm the mental wellbeing of an individual. In 2017, the United Nations Office on Drugs and Crime (UNODC) estimated that 271 million people in the age group 15–64 years used any form of drugs and 35 million people suffered from disorders associated with psychoactive substance use.

By the end of 2017, 11.8 million deaths were recorded globally due to direct and indirect use of psychoactive substances (predominantly tobacco, alcohol and drugs), out of which 11.4 million were premature deaths. According to the World Health Organization (WHO) Global Health Estimates, in 2019, the proportion of Disability Adjusted Life Years (DALYs) due to alcohol use disorders globally was 0.76% and 0.78% due to drug use disorders [4] whereas, in Nepal, DALYs were 0.5% and 0.29% due to alcohol and drug use disorders, respectively.

Medical students are at a significant risk of

developing addiction due to easily accessible psychoactive drugs, strenuous work, and relative isolation from social life. Unquestionably, addiction is a grave issue amongst medical students posing a threat to their prestige and career. College students being the prime target are likely to start substance abuse and are most likely to continue. Moreover, the negative impact on their academic and clinical performance affects the health outcomes of patients. Hence, the lifestyle and behavior of medical students need to be studied carefully.

METHODS

A descriptive cross-sectional study conducted in Kathmandu University School of Medical Sciences (KUSMS) from December 2019 to June 2020 commenced after ethical approval from the Institutional Review Committee of KUSMS (Ref: 258/19). Students from the first to the fourth year enrolled under the MBBS program were eligible and thus involved in the study after obtaining their written informed consent whereas foreign students were excluded.

The sample size was calculated as follows,

$$n = Z^2 \times p \times (1-p) / e^2$$

$$= (1.96)^2 \times 0.5 \times 0.5 / (0.08)^2$$

$$= 150$$

Where,

n= required sample size

Z= 1.96 at 95% Confidence interval (CI)

p= prevalence, 50%

e= margin of error, 0.08

Convenient sampling was done. A modified version of the World Health Organization - Alcohol, Smoking, and Substance Involvement Screening Test version 3.0 questionnaire was used to collect responses from students.

Data of 172 students were thoroughly entered, and descriptive analysis was done using IBM SPSS version 25. Descriptive parameters such as frequency and percentage were calculated and depicted in tables and figures.

RESULTS

The overall prevalence rate of the psychoactive drug was 76 (44.2%) [CI=43.6%-44.8%]. Among 172 students, 100 (58%) were males and 72 (42%) were females. The mean age (\pm SD) of the participants was 20.01 \pm 1.576 (Table 1)

Alcohol, used by 72 (41.86%) of students was the most common, followed by tobacco products and cannabis, used by 24 (13.95%) and 17 (9.88%) respectively. Only two of the students reported the use of opioids and sedatives (Table 2).

Table 1. Psychoactive drug use among gender and years of study in medical school.

Variables		Frequency (%)
Gender	Male	59 (59.00)
	Female	17 (23.6)
Year	First year	16 (36.4)
	Second year	16 (38.1)
	Third year	20 (46.5)
	Fourth year	24 (55.8)

Table 2. Percentage of psychoactive drugs used according to gender

Variables	Frequency (%)	Male (%)	Female (%)
Tobacco	24 (13.95)	23 (95.8)	1 (4.2)
Alcohol	72 (41.86)	55 (76.4)	17 (23.6)
Cannabis	17 (9.88)	16 (94.1)	1 (5.9)
Opioids, sedatives	2 (1.16)	2 (100)	-

Moreover, opioids and sedatives were used in conjunction with alcohol, tobacco products, and cannabis. About one-third of students (31.58%) reported that they used more than one psychoactive substance (Table 3).

None of the students reported the use of cocaine, amphetamines, inhalants, and hallucinogens. Most of the students were occasional users but about two-thirds (58.33%) of tobacco consumers are found to be using it regularly. About one-fourth (23.6%) of the students started using psychoactive drugs after joining medical school.

Causes:

The causes were followed by frustration or relieving stress, peer pressure, and social obligation (Table 4).

Moreover, 3 (17.65%) of cannabis users had tried to cut off their substance use in the last three months and friends and relatives expressed their concern to 4 (23.53%) of the participants. Pleasure and experimentation were found to be a major cause of substance abuse. Frustration, peer pressure, and social obligation were also among the notable causes of substance abuse.

Regarding the consequences of drug use, the majority of the students did not face any consequences in the social, legal, and health aspects of their lives.

Table 3. Polydrug usage patterns.	
Psychoactive drug	Frequency (%)
Alcohol, tobacco, and cannabis	13 (17.1)
Tobacco and alcohol	7 (9.21)
Alcohol and cannabis	4 (5.26)
Alcohol only	48 (63.16)
Tobacco only	4 (5.26)

Table 4. Cause of psychoactive drug abuse.	
Variables	Frequency (%)
Academic pressure	6 (5.0)
Peer pressure	16 (13.3)
Frustration/ stress relief	16 (13.3)
Advertisement	1 (0.8)
Pleasure	38 (31.7)
Experimentation	29 (24.2)
Feeling of compulsion	4 (3.3)
Social Obligation	10 (8.3)

Some of the drug users skipped classes once or twice leading to academic deterioration. However, some tobacco users reported monthly health issues 1 (4.17%) and weekly financial issues 3 (12.5%), none of which were observed among alcohol and cannabis users.

DISCUSSION

Substance abuse (tobacco, alcohol, prescribed and illicit drugs) is widely recognized as a critical area when it comes to medical students. Psychoactive drugs excluding caffeine were taken into account to determine the prevalence, and pattern and to shed light on relatively unexplored impacts on health, education, social life, legal and financial aspects in medical undergraduate students of different academic stages.

CONCLUSION

The study showed that there was a significant increase in the use of substances among the medical students which can be considered to be a worrisome matter. Since psychoactive drug use in medical students affects the health and well-being of an upcoming doctor, and to a greater extent affects the health of the patient, therefore, it is necessary to adopt effective and suitable counseling measures promptly.

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THE ART OF APOTHECARY: 17th Century Female Pharmacists



Samriddhi Khanal
Fourth Semester, BPharm

In the bustling world of modern medicine, there exists an ancient craft that intertwines the precision of science with the subtlety of sensibility—the art of apothecary. The word ‘apothecary’ is derived from the Latin *apotheca*, meaning a place where wine, spices, and herbs are stored. It referred to both, the person who manufactured and dispensed medicines, and the shop in which those medicines were sold. Well established as a profession by the seventeenth century, the apothecaries were chemists, mixing and selling their medicines. They sold drugs from a fixed shopfront, catering to other medical practitioners, such as surgeons, but also to lay customers walking in from the street. The appearance of the first apothecary in history was in Baghdad in 754 AD; it was managed by the scientist Jaber Ibn Hayyan, the founder of chemistry science. Nowadays, terms such as ‘Pharmacist’ or ‘Chemist’ have replaced the use of ‘apothecary’.

In 1618, King James I granted the Apothecaries their guild, known as the Company of Apothecaries, which originated from the Guild of Grocers. As part of their

apprenticeship training, apothecaries had to learn techniques such as fermentation and distillation to prepare medicines, extract essences from natural products, compound them into medicines, and become proficient in Latin to follow the *Pharmacopoeia Londinensis*. The training ended with apprentices taking the final oral exam, demonstrating their competence towards the Company of Apothecaries. Unsurprisingly, there was no formal recognition of women working as apothecaries either within family businesses or as individuals. But a closer look at the records reveals several women working as medical practitioners and traders in this early period.

In the early days, women had to learn the basic techniques needed to make home remedies. They followed old traditions of making medicines to treat their extended families, and poor women often sold herbs and medicines to support their families. Although many were skilled in making medicinal home remedies, only a few women ran their own apothecaries, competing with males for the right to prescribe medicines.

Wives could not own property, but qualified widows were allowed to run family businesses. Wives of apothecaries shared the work in their husband's shops, and the years a wife or daughter spent working in the family apothecary shop were considered an apprenticeship by the Company of Apothecaries.



Early Italian Pharmacy, Italian School, 17th Century; Oil on Canvas.

Widow Wynke: She was the wife of Tobias Wynke, elected in 1618 as Beadle of the company of apothecaries. After being widowed in 1628, she worked independently as an apothecary and trained apprentices.

Susan Reeve Lyon: As a widow, Susan Reeve ran her apothecary shop with an apprentice, Thomas Beedham. Her second husband, William Lyon whom she married in 1627, was not permitted by the Apothecaries to practice alongside her for two years until he was deemed to have learned the necessary skills from his wife. After some circumstances, having to

prosecute Susan Lyon, the College of Physicians did not question her competence or the quality of her medicines.

Elizabeth Gooking Greenleaf: She was the first female apothecary in the Thirteen Colonies. In 1727, Elizabeth moved to Boston to open an apothecary shop. She is considered to be the first female Pharmacist in the United States.

Maria Dauerer: She was the first known woman apothecary in Sweden. Upon her husband's death, she inherited the apothecary and work license by existing guild regulations.

Anne Crosse: In 1641, She inherited her husband's apothecary shop upon his death but was considered unqualified to supervise an apprentice. Instead, the Apothecaries allowed Anne Crosse to run her shop and train her apprentice with the help of journeyman apothecary John Rogers.

It represents only a few of the many closeted women pharmacists in the seventeenth century worldwide. These women's endeavors were not without their challenges but acted as a benchmark for modern women's conquest in the field of pharmaceutical sciences.

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Plastic Pollution and Biodegradable Plastics for Packaging of Pharmaceuticals



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Plastic Pollution is still one of the major environmental concerns today. It is the accumulation of plastics as well as microplastics in the environment that has harmful effects on the health of living beings as well as on their habitat. Every year, about eight million tons of plastic waste is estimated to contaminate the oceans of the coastal nations. Despite recent advances made to combat plastic pollution, it will never truly disappear, unless we can reduce our everyday dependency on plastics' use.

One way of reducing plastic pollution is the use of biodegradable plastics. These plastics can be decomposed due to the action of water, microbes, biomass etc. Examples of biodegradable plastics include Polyhydroxyalkanoates (PHAs), Polylactic acid (PLA), Starch blends, Cellulose-based plastics, Polyglycolic acid (PGA), Polybutylene succinate (PBS), Poly(vinyl alcohol) (PVA, PVOH) etc. However, some of them are decomposed in specific composting systems and can show further environmental issues, over conventional plastics, when a proper composting system isn't used.

Certain conventional plastics have been extensively used as packaging materials of pharmaceuticals, since long ago, because of their cheapness, lightness and adequate product stability during the shelf-life of a product, among other reasons. In recent years, emphasis has been given to the use of alternatives to these plastics. However, this is easier said than done as there are strict requirements for packaging materials used for pharmaceuticals.

Challenges to be faced while adopting biodegradable plastics as packaging materials of pharmaceuticals are as such: -

- Maintaining the necessary protection against moisture, oxygen, light etc while ensuring biodegradability of the plastic is going to be a challenge.
- Pharmaceuticals require stable packaging to maintain their efficacy and safety, throughout the shelf-life. Biodegradable materials may degrade over time, affecting the product's stability and shelf-life.
- Some biodegradable plastics may interact with drug formulations, leading to leaching or alteration of the drug.

- Compatibility studies are crucial to ensure undesirable effects will not occur.
- Demonstrating the safety and effectiveness of biodegradable plastics to the regulatory bodies can be challenging and time-consuming.
- Developing and implementing biodegradable packaging technologies can be costly initially. Environmental benefits and economic feasibility should be equally considered.
- Biodegradable plastics may require different processing techniques, affecting manufacturing processes and equipment. The staff will need to be trained in order to handle them efficiently.
- While biodegradability is desirable, ensuring proper disposal and recycling infrastructure for these materials is crucial. Equal support of municipal waste management system is required.
- Educating consumers about the benefits and proper disposal of biodegradable packaging is essential as misunderstandings can lead to incorrect disposal practices.

While biodegradable plastics might sound amazing, they cannot be utilized as packaging materials for pharmaceuticals immediately. Further advancements have been carried out to better suit pharmaceuticals. Measures such as reducing material usage wastes along with recycling and reusing can be used to combat plastic pollution.

Drug recalls and quality of pharmaceutical products in Nepal



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Pharmaceutical products are essential to treat, prevent and save the lives of millions of people globally. They should be safe, effective and of good quality. Such products should be prescribed by an authorised medical practitioner and used rationally. However, pharmaceutical items that fail to live up to quality and regulatory standards endanger the health of the current and future population. Such products may be substandard or falsified. In addition to placing patients' lives at risk and adding to the financial and social burden on society, falsified or counterfeit medications have the potential to develop drug resistance. The market's spread of such inferior and fabricated goods is due to a number of factors, including a lack of access to reasonably priced, high-quality, safe, and effective medical supplies, weak governance, and unethical behaviour in hospitals and pharmacies. Another factor contributing to this issue is the lack of technical capability in testing, distribution, production, and quality control.

Nepal is one of the least developed countries and it shares open and poorly regulated borders with India and China.

These two nations are regarded as significant producers of low-quality and falsified pharmaceutical goods that are sold around the world. In 2019, it was anticipated that the domestic market for medical items in Nepal was worth 70 billion Nepalese rupees. Of these, 36 billion were pharmaceuticals, raw materials, and surgical equipment. The production, distribution, import, and export of all pharmaceutical items into Nepal are permitted by the Department of Drug Administration (DDA). Preventing the misuse or abuse of drugs and related pharmaceutical substances is the responsibility of the DDA in Nepal, which is comparable to the US Food and Drug Administration (FDA). In the past, various researchers have suggested that inferior, fake, and unlicensed medications are being sold in the Nepali market. DDA Nepal recalls marketed drugs if the drugs do not fulfil any requirement as indicated in the Drug Act 2035 B.S.

According to a report, DDA Nepal recalled 346 pharmaceutical items between 2010 and 2020. Antimicrobials made up the top 10 most frequently recalled medications

(13.6%), which were followed by gastrointestinal supplements (10.1%), vitamins and minerals (8.1%), antiseptics (6.6%), hormones and contraceptives (5.2%), pain and palliative care medications (4.6%), items for replenishing fluid and electrolytes (3.7%), cardiovascular and renal medications (2.0%), anti-diabetes (1.4%), and antihistamines (1.4%). The remaining recalled medications included antirheumatics, prostaglandin analogues, respiratory system, and central nervous system medications. Because there was insufficient information available, nineteen medicines were categorised as "others" and not placed into any of those categories. This classification excluded Ayurvedic medications.

For each pharmaceutical product that was recalled, the DDA gave an explanation. A large number of medications (26.8%) were recalled due to non-registration at DDA. Failure to comply with the microbiological test accounted for 23.7% of recalls of registered pharmaceuticals, followed by the dissolving test (11.5%), the quantitative testing for the active pharmaceutical component (6.6%), and the physical qualities and packaging (6.6%). Twelve items had one or more contaminants, and eleven products did not meet labelling regulations. A small number of samples that were classified as "others" were recalled because they failed the identification test and contained active ingredients in dietary supplements. Tablets were the most

recalled dosage forms followed by powder, solution, capsules, syrups/suspension and creams/ointments. Some products have no recognised dosage forms, hence they are classed as "others". At the time of the recall, the shelf-life of the recalled medications varied from less than three months (16.4%) to more than two years.

Data indicates that Nepal's total medicine recall trend is rising. Beginning with just one medication recall in 2010 and reaching its peak of 123 in 2018. Ninety of the medications that were recalled this year were not registered with the DDA.

This suggests that the open and uncontrolled border with India may have contributed to the considerable problem of unregistered drug circulation in Nepal's market. The antimicrobial medication group experienced the greatest frequency of recall occurrences among all the recalled groups.

Most of the recalled therapeutic categories of medicines like vitamins and minerals, nonsteroidal anti-inflammatory drugs, other antipyretic and analgesic agents, antiseptics, fluid and electrolyte replenishment items and others are over-the-counter medicines that can be bought from the pharmacy without a prescription. Such medicines can pose a significant threat to patients who consume them.

Few anti-diabetes medicines were also

recalled. Consumption of such medicines may increase the incidence of macrovascular and microvascular complications due to compromised glucose control. According to a report, several laboratory tests, including microbiological, assay, content uniformity, weight fluctuation, impurity, dissolution, friability, identification, and sterility tests, were unsuccessful for some of the medications, which led to their recall. Many of these mistakes can be attributed to insufficient quality control methods used in the production process, improper storage and shipping practices, and other logistical problems. According to a report, several laboratory tests, including microbiological, assay, content uniformity, weight fluctuation, impurity, dissolution, friability, identification, and sterility tests, were unsuccessful for some of the medications,

which led to their recall. Many of these mistakes can be attributed to insufficient quality control methods used in the production process, improper storage and shipping practices, and other logistical problems.

In conclusion, there have been a lot more pharmaceuticals that have been recalled. This could be due to increased DDA surveillance or a real rise in the quantity of falsified, fake, and unregistered medications on the market. Therefore, more studies are needed to understand the prevalence of substandard and falsified drugs in Nepal covering different parts of the country on a regular basis. Enhancing post-marketing surveillance and implementing stricter regulatory frameworks are our recommendations for the pharmaceutical manufacturing sector.

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Clinical Pharmacists: Save Time in an Emergency



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The emergency department (ED) presents numerous issues with medicine selection, dose, delivery, and monitoring. The American College of Emergency Physicians believes that pharmacists play an important role in ensuring efficient, safe, and effective pharmaceutical usage in the emergency department. Pharmacists should be fully integrated members of the ED multidisciplinary team, actively participating in patient care choices in order to optimize pharmacotherapy for patients. Because pharmacists are unable to generate revenue by invoicing for their services in most states, quantifying cost avoidance is a popular method for demonstrating the monetary value of clinical pharmacy services.

Although precise data on cost avoidance is difficult to get, published papers have revealed cost savings ranging from thousands to millions of dollars through pharmacy interventions in a variety of healthcare settings. Clinical pharmacy services in the emergency department have shown cost savings ranging from hundreds of thousands to millions of dollars and may increase survival to hospital admission.

Although cost avoidance is a popular technique to illustrate the value of clinical pharmacy services, pharmacists' ability to save physicians time has also been demonstrated. The growing role of clinical pharmacy in the ED has allowed clinical pharmacists to do activities that were previously the responsibility of ED physicians. Grill et al. assessed the role of clinical pharmacists in this scenario and found that 69.8 hours of physician time were saved over the course of their trial, which equalled to 75 minutes every 10-hour shift.

Between 2011 and 2014, the average number of patients reviewed by doctors in the ED across the country was 2.5 per hour. A lot of doctors get their pay depending on how each Current Procedural Terminology (CPT) code is allocated a relative value or RVU. The first RVU is made up of three parts: work (55%), practice costs (42%), and professional liability insurance (3%). The geographic practice cost indexes, which aim to account for variations in the cost of living across the nation, are used to modify these three components. Finally, a conversion factor that is calculated annually is multiplied by the total RVU.

Paying emergency physicians comes directly from the creation of RVUs. Institutions will have different RVUs per patient.

There are two reasons why RVU and RVU compilation are discussed: First, there appears to be some confusion in the generation of physician time saved, as shown by Grill et al. This is comparable to the confusion that frequently arises when paying doctors, as the calculation of RVUs demonstrates. Second, clinical pharmacists' time savings to doctors directly impacts doctors' RVUs. More RVUs are produced by a doctor who can see one more patient every three hours.

When taking into account the time-saving totals reported by Grill et al. (i.e., 75 minutes for a 10-hour shift), the number of physician hours saved was 0.125 hours for each pharmacist hour worked. For an 8-hour shift, this translates to 1 physician-hour, 2.5 additional patients, and 7.75 RVUs; savings of 0.969 RVUs per hour result from this. At \$36 per RVU, an 8-hour shift would cost about \$279. According to Grill et al., their emergency department is staffed for 10 hours a day, seven days a week, or 3,640 hours annually. According to their research, their physicians are able to save over \$127,000 annually.

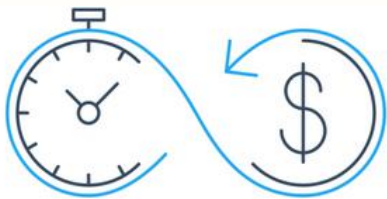
These findings raise the following query: Should the doctors or medical groups who have a contract to provide care in

emergency departments pay clinical pharmacists or the hospitals that employ them? Hospitals use clinical pharmacists primarily to reduce costs. Cost avoidance is influenced by a number of factors, including the therapeutic optimization and safety the ED pharmacist offers the patient, the guidance and support the ED pharmacist gives to nursing, the direct drug cost savings to the pharmacy, and the recommendations and services—traditionally pharmacy services—provided to the doctor. This explains why the cost avoidance figures are quite large and challenging to measure.

Physicians who save time see more patients and provide more RVUs, which results in higher direct compensation to individual doctors and physician organizations. Physicians earn directly from this, but the hospital may gain indirectly from it. According to Grill et al.'s review, the ED pharmacist frees up the staffing physician group to treat more patients, resulting in an annual savings of \$127,000 that goes directly into their pockets. The current debate centers on whether medical groups who contract with hospitals should pay them for the extra RVUs that the hospital's employed pharmacists helped them produce over time.

It is another question entirely whether or if hospitals would pay clinical pharmacists for his extra money, and how physician groups may fairly reimburse hospitals for ED clinical

pharmacy services. However, the goal of this essay is to raise awareness of an unexplored source of income for clinical pharmacists.



Clock and Dollar Sign Illustration. (n.d.). [Digital image]. Retrieved from: <https://www.seoclerk.com/faq/25263/10-ways-you-can-save-time-and-be-more-productive>

Since no two ED clinical pharmacists have the same experience, aptitude, or skill set, some will be more successful in reducing costs and saving ED doctors' time than others. Physicians' dependence on pharmacists will also differ. While some physicians use clinical pharmacists substantially less, others rely heavily on their assistance. The amount of time emergency department clinical pharmacists save doctors will vary depending on their experience and how well physicians get along with the clinical pharmacists in their department.

Could the concept of "physician time saved" be extended outside of emergency departments? Physicians can see more patients and save time by consulting pharmacists on antimicrobials, anticoagulants, pain management, and other pharmaceuticals. This could be another source of income to look into, even if RVU creation outside of the ED might get trickier in terms of physician reimbursement.

Conclusion :

- 1) In a range of healthcare environments, pharmacists have continuously shown how to save costs by avoiding unnecessary expenses.
- 2) Physician time affects several things, including patient happiness, the course of chronic diseases, prescribing patterns, physician satisfaction, and the likelihood of malpractice claims. greater patient evaluations, RVUs, and hence more physician reimbursement should result from greater physician time. Physician reimbursement may be directly increased by the ED clinical pharmacist.
- 3) Without directly benefiting the hospital or pharmacist monetarily, this reimbursement directly benefits the doctor and/or physician group.
- 4) As such, it raises the question of whether hospitals that hire ED clinical pharmacists or the pharmacists themselves ought to be paid for the time and subsequent financial gain that the physicians receive from their services.
- 5) This raises the question of whether or not pharmacy service income generating in general is new in this context.

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Pharmacogenetics of Adverse Drug Reactions



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1. Introduction

1.1 Adverse drug reactions

The healing powers of nature have been utilized by mankind for thousands of years. The "Canon of Medicine," a main medical textbook used by doctors for more than 600 years, contains descriptions of over 800 medications of plant, mineral, or animal origins written by the Persian physician Avicenna in the eleventh century. When considering the potential harm that these medications can do, the Swiss alchemist and father of toxicology, Paracelsus, is cited as saying, "Solely the dose determines that something is not a poison." To put it another way, all medications are toxic, but what makes them toxic is the dosage. As an illustration, consider digitalis, which is commonly used at low doses to treat cardiac arrhythmias but is also known to cause cardiac toxicity and sudden cardiac death in overdose cases. Adverse drug responses (ADRs) are unintended consequences like this. "A response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modifications of physiological function," is how the World Health Organization (WHO) describes an adverse drug reaction.

The regrettable thalidomide controversy of the 1960s brought ADRs to light. Thalidomide, which was sold over-the-counter and promoted as an antiemetic during pregnancy, caused thousands of babies to suffer from phocomelia and even pass away due to its severe teratogenic consequences.

This gave rise to the yellow card system of pharmacovigilance in the United Kingdom. Even with great advancements in pharmacovigilance, adverse drug reactions (ADRs) still account for up to 6.5% of acute hospital admissions. While some ADRs are less predictable, others are expansions of desired pharmacological effects. They fall into two general categories: type B, or idiosyncratic, and type A, or intrinsic. Reactions classified as type A can be easily anticipated based on the drug's pharmacology. These toxicities are usually dose-related and frequently found before a medicine is granted a license. Warfarin-related bleeding is one example. Most adverse drug reactions (ADRs) are caused by type A responses. On the other hand, type B reactions are difficult to anticipate based on the drug's established pharmacology.

They are not well replicated in animal studies, and there is no obvious dose association. Despite being less frequent, they have a high risk of morbidity and mortality. The pathophysiology of type B reactions is frequently immune- or genetic-based.

1.2 Pharmacogenetics

Pythagoras recorded in the sixth century BC that some people had severe negative reactions to fava beans. It is now recognized that these people have variations in the glucose-6-phosphate dehydrogenase (G6PDH) gene. Deadly hemolytic anaemia can be caused by the ensuing G6PDH enzyme deficit in affected persons who consume fava beans. German doctor Friedrich Vogel created the term pharmacogenetics in 1959 after it was discovered that patients receiving phenylthiocarbamide had differing taste perceptions. The study of how genetic diversity influences an individual's response to medication is known as pharmacogenetics. The word "pharmacogenomics" was coined more recently. This typically includes a broader range of all the genes linked to medication reactions. On the other hand, these phrases are frequently used synonymously.

Candidate gene studies examine the relationship between preselected genes and a certain trait with an emphasis on a particular disease. Before identifying certain single-nucleotide polymorphisms (SNPs), a candidate gene must be chosen.

Single nucleotide polymorphisms (SNPs) represent the most prevalent type of genetic variation in the human genome, occurring at a high frequency in DNA. A candidate gene is associated with a certain illness outcome if a specific allele or SNP is found more frequently in affected individuals than in unaffected persons

2. Role of Genetic Codification in Adverse Drug Reactions

Several observations imply that ADRs might run in families, even if a Mendelian pattern of inheritance is typically impossible to discern. Even in situations where genetic alterations are found, they are merely suggestive and cannot provide a certain prediction of an adverse drug reaction (ADR). Furthermore, rather than harmful mutations or completely syndromic clinical presentations, ADRs might occur in patients who carry variations of unknown significance (VUS). Complex molecules including genomic DNA, mitochondrial DNA (mtDNA), and other types of RNAs contain genetic information. The sixty-four nucleotide triplets, three stop signals, numerous regulatory sequences, and sections interacting with both whole RNA sets and mtDNA make up the genetic code, which organizes this information.

Twenty canonical and two extra amino acids are specified by all the information included in the genetic code, resulting in a vast array of proteins. Proteins are essential to life because they enable a wide range of cellular

functions and interact with the environment to regulate and maintain equilibrium in every facet of cell life. Therefore, the intricate interactions between genetic information and environmental factors in a particular medical situation must be taken into account while studying the genetic basis of ADR. Lastly, it is important to keep in mind that the enormous variability of genetic information is passed down from generation to generation, sometimes changing and adding a new level of variability that may have significant clinical implications. A "gene" is a sequence of DNA that is located in the genomic DNA at a specific location, or "locus". Every person possesses two copies of the non-sexual genetic material known as an "allele", which are essentially distinct variants of the same gene found at the same locus and inherited from either parent. Every allele has a unique genetic sequence that varies throughout individuals. When an allele, excluding inbred coupling, is detected with a frequency in the general population less than 1%, it is referred to as a "variant". In clinical contexts, a variant is typically referred to as a "mutation" when it is linked to at least one particular pathogenic manifestation. Rather, a variant is referred to as a "Single Nucleotide Polymorphism (SNP)" when its frequency in the general population is greater than 1%. The most frequent causes of genetic code variation are single nucleotide polymorphisms (SNPs); potential mechanisms include copy number variations, insertions, deletions and

duplications. Although the influence of SNPs on the risk of ADRs varies, current research has shown that SNPs affecting regulatory RNAs play a significant role in the effects of drugs. Relevant variations and SNPs in pharmacogenetics are denoted with the star (*) sign. The arrangement of single variations or SNPs throughout a gene is known as a "haplotype." The interplay between coding and non-coding genetic information directly contributes to the significance of haplotypes in pharmacogenetics. One or more messenger RNAs (mRNA), which each facilitate protein production or have regulatory functions, can be encoded by genes. The enormous number of non-coding RNAs that have been discovered has put the conventional notion of genes to the test. This has shown that genetic regulatory information is relevant for clinical settings and that many biological activities overlap.

A recent review concentrated on the function of microRNAs (miRNAs), which are 18–22 nucleotide RNAs that modify the post-transcriptional expression of several genes that encode proteins.

Genetic variations in the sequences of the miRNA genes or variations in the levels of circulating miRNAs can add to inter-individual variability in drug response, both in terms of toxicity and efficacy.

3. Examples

3.1 Central nervous system drugs

The majority of psychiatric medications, including benzodiazepines, anti-epileptics, anti-depressants, and neuroleptics, are processed by CYP enzymes. When patients are treated with psychotropics for bipolar disorder, depression, or schizophrenia, CYP2D6 variations are the cause of adverse drug reactions (ADRs). Risperidone's plasma concentrations are impacted by the CYP2D6 and 3A4 enzymes that metabolize it. In schizophrenia patients, the plasma concentrations of risperidone and its metabolite 9-hydroxy risperidone are influenced by CYP2D6*10 and CYP2D6*4 SNPs. ADRs such as weight gain and extrapyramidal symptoms are influenced by CYP2D6 variations, and CYP2D6-PMs exhibit higher rates of ADRs and discontinuation as a result of ADRs.

The enzymes CYP3A4/5, 2C9, and 2C19 metabolize the majority of benzodiazepines. The plasma concentration of clonazepam is impacted by CYP3A4 and NAT2 variations, which are linked to ADRs.

3.2 Antineoplastic drugs

ADRs related to antineoplastic medications are typically severe and occasionally fatal. Regardless of their pharmacological classification, the great majority of anti-cancer medications exhibit a highly intricate pharmacogenetic profile that necessitates pharmacogenetic evaluation before beginning treatment to maximize effectiveness and reduce toxicity. SNPs in BAHD1 may be protective against this ADR, while SNPs in SYNE2 and MRPL47 are linked

to an increased incidence of vincristine-induced peripheral neuropathy in children with acute lymphoblastic leukaemia.

3.3 Anticoagulants and antiplatelets

Oral anticoagulants and antiplatelet agents are a common cause of ADRs. Skilled drug interaction management is essential to ensure the safe and effective use of these therapies. Special attention should be paid to the most commonly used antiplatelet treatments (aspirin, clopidogrel, prasugrel, ticagrelor) and anticoagulants, such as warfarin and the new generation of anticoagulant agents (dabigatran). Warfarin (Coumadin) is a drug with a narrow therapeutic index that inhibits the synthesis of vitamin K-dependent clotting factors and is used in the prevention and treatment of thromboembolic disorders. VKORC1, CYP2C9, CYP3A4/5, and CYP4F2 variants are genetic determinants of warfarin dosing. The VKORC1 variant, c.-1639G>A, is associated with increased sensitivity to warfarin and lower dose requirements. CYP2C9*2 and CYP2C9*3 alleles are also associated with lower dose requirements. The FDA-approved drug label for warfarin used CYP2C9 and VKORC1 genotype information to assist in the selection of warfarin dosing.

Aspirin is a golden standard in antiplatelet therapy. Aspirin inhibits the platelet cyclooxygenase (COX) system involved in thromboxane A₂ (TXA₂) formation. Antiplatelet effects of aspirin are ineffective in 5-45% of the patients due to

aspirin resistance which is associated with multiple variants in ADME genes. 38 aspirin-response-related genetic variants with clinical significance have been identified, 26% of which are related to drug efficacy and 74% to drug toxicity. In comparative studies among European and East Asian populations, of 23 aspirin-related variants investigated, 7 (rs1050891, rs6065, rs7862221, rs1065776, rs3818822, rs3775291 and rs1126643) showed similar frequencies, 10 (rs2228079, rs1613662, rs4523, rs28360521, rs1131882, rs1047626, rs3856806, rs2768759, rs7572857 and rs1126510) showed differences in Europeans, and 5 (rs10279545, rs730012, rs16851030, rs1353411, rs1800469) showed substantial differences between Asians and Europeans.

3.4 Anti-Tuberculosis drugs

Treatment with anti-tuberculosis drugs may cause severe ADRs associated with NAT2, CYP2E1 and GSTM1 variants. NAT2 slow acetylators are clear candidates to develop ADRs in response to isoniazid. Patients with homozygous mutant-type or heterozygous genotype at the CYP2E1 RsaI polymorphism are less likely to experience hepatotoxicity than patients with homozygous wild-type genotypes. For the 96-bp deletion-insertion SNP of the CYP2E1 gene, homozygous mutants exhibit increased hepatotoxicity risk. TNFA-308G/A has been associated with anti-tuberculosis drug-induced hepatitis in Korea.

3.5 Opiates

Chronic pain is a major problem of health. Overuse of opiates or inappropriate (sometimes indiscriminate) administration of opiates to patients with different forms of pain is causing an alarming increase of ADRs. Methadone is metabolized (N-demethylated) in the liver mainly by CYP2B6, followed by CYP3A4, 2C19, 2D6, 2C18, 3A7, 2C8, 2C9, 3A5, and 1A2. Polymorphic variants in the CYP2B6, 3A4, 2C19, 2D6, and 3A5 genes are responsible for an increase in methadone plasma concentrations, together with decreased N-demethylation, and decreased methadone clearance. CYP2B6*6/*6 carriers show detrimental ADRs, with diminished methadone metabolism and clearance. In contrast, CYP2B6*4 carriers exhibit decreased plasma concentrations due to increased methadone clearance. DDIs with antiviral drugs are frequent, altering methadone pharmacokinetics and pharmacodynamics. CYP inhibitors alter methadone exposure, and CYP inducers decrease methadone exposure, potentially causing a withdrawal syndrome.

3.6 Other pharmacogenomics-related ADRs

- Minocycline: Minocycline drug-induced liver injury is associated with the HLA-B*35:02 allele.
- Amlodipine: ADRs associated with ABCB1 variants have been observed in Russian patients with hypertension treated with amlodipine (35.3% in ABCB1-C3435C, 6.7% in T3435T and 11.3% in C3435T carriers).

- Cyclosporin A: IL1A, IL10, TGFB1 and androgen receptor gene variants affect susceptibility to cyclosporin A-induced gingival overgrowth in renal transplant patients.
- Dapsone: Dapsone-induced agranulocytosis has been reported in a Croatian patient harboring the NAT2 *5/*6 genotype, with low N-acetyltransferase 2 enzyme activity.
- Artesunate: Artesunate is an antimalarial agent metabolized by CYP2A6 enzymes. Carriers of the CYP2A6*1B variant show a higher incidence of ADRs in the Malaysian population.

4. Conclusion

ADRs may arise in more than 30–60% of prescription medication orders. More than 60% of ADRs are linked to pharmacogenomics, which also explains

about 80% of the variability in medication pharmacokinetics and pharmacodynamics. Pathogenic, mechanistic, metabolic, transporter, and pleiotropic genes that code for effectors (enzymes, proteins) involved in drug metabolism combine to form the pharmacogenetic machinery. Epigenetic factors (DNA methylation, chromatin remodeling, histone changes, miRNA regulation) regulate all of these genes. Drug safety and efficacy are determined by the pharmacoepigenetic machinery, which is configured by the integration of genomic and epigenetic effectors. Severe adverse drug reactions (ADRs) are linked to a variety of drug classes, including anti-HIV, anti-tumor anti-inflammatory, CNS, statins, anti-diabetics, and many more. These modifications can be either epigenetic or genomic.

Pharmacogenomic evaluation is advised to lower adverse drug reactions and maximize treatments in an economical manner.

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Medication Errors and Its Remedy



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Medication errors are those preventable events that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedures, and systems, including prescribing, order communication, product labelling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use. Errors in medication administration lead to a range of negative effects, including interactions between different drugs, an increase in admissions to hospitals, more frequent visits to outpatient facilities, longer stays in hospitals, higher costs involved in patient management, and an increased risk of mortality for patients.

Medication errors typically have complex causes, encompassing human errors, system deficiencies, and external influences. The common reasons are as follows:

1. Mistakes in writing or filling prescriptions

2. Failure to recognize drug interaction
 3. Failure to properly instruct patient on drug dosage and administration
 4. Wrong dosage administered
 5. Similar drug names or medication appearance
 6. Medical abbreviations
 7. Failure to properly input prescription onto a computer database
 8. Problems with drug supply and storage, e.g., pharmacy dispensing errors or issues with ward stock management
 9. Staff health status, e.g., fatigue, stress
- Interruptions or distractions during drug administration

Correct medication use occurs when the "five rights" are followed, meaning the right dose of the right medication is administered to the right patient, at the right time, and by the right route. In all pharmacy practice environments, pharmacists bear greater responsibility for ensuring the proper utilization of medications and safeguarding patient safety.

Conducting a thorough evaluation of medications and ensuring consistency can

effectively reduce frequent medication mistakes, particularly within hospital settings. Medication reconciliation involves compiling an accurate record of the patient's prescribed medications, current usage, as well as a comprehensive inventory of non-prescription supplements and drugs.

Some of the possible actions that can be taken by patient and clinical staffs to prevent medication errors are tabulated below:

Patients	Clinical Staffs
Find out the name of each of your medicines	Adhere to five rights of medication safety
Ask questions about how to use the medications	Do provide appropriate measurable devices if needed
Know what your medications are for and Read drug labels and follow directions	Conduct medication reconciliation with any transition in care including allergy information and adverse drug reactions
Keep all your healthcare providers informed about your medications and dietary supplements including vitamins and herbals	Consider interventions to reduce medication errors

To guarantee safe, effective, and rational drug use, pharmacists should monitor how medications are actually used in patient care areas. This includes participating in drug therapy monitoring, which includes, when appropriate, the assessment of therapeutic appropriateness, medication administration appropriateness, and potential duplication of therapies; reviewing for potential interactions; and evaluating relevant clinical and laboratory data.

Through increased vigilance and close collaboration with patients, pharmacists, and other medical professionals, healthcare providers can reduce drug errors. But there isn't a single remedy that can get rid of every medication mistake. Transparent and open discussion is one tactic for addressing the safety gap and lowering the incidence of medication errors. Although the work of medication safety is the responsibility of many, the coordination of the efforts and assuring communication across all professionals is optimized if the effort stems from one individual.

Clinical Pharmacy Practice In Nepal



Ajit Bhandari
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The American College of Clinical Pharmacy (ACCP) defines clinical pharmacy as “a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention”. The major work of a clinical pharmacist is to collaborate with other healthcare professionals mainly doctors and nurses for drug therapy monitoring, giving drug information to patients or even other healthcare professionals and giving therapeutic suggestions to patients.

In Nepal, a significant majority of both private and government-run hospitals have instituted hospital pharmacy services. The genesis of this initiative traces back to 1956 when Santabhavan Hospital (now Patan Hospital) pioneered these services. This model was subsequently emulated by other government institutions such as Tansen Mission Hospital, Kanti Hospital, and Bir Hospital. Similarly, non-governmental hospitals including Dhulikhel Hospital (Kavre) Manipal Teaching Hospital (Pokhara), and Kathmandu Model Hospital (Kathmandu) adopted this practice, delivering exemplary patient care.

In recent years, several private hospitals, including the College of Medical Sciences-Teaching Hospital in Bharatpur, Nepal Cancer Hospital and Research Center, Medicity Hospital, Nepal Medicity Hospital in Lalitpur, Grande International Hospital, Nepal Medical College and Teaching Hospital, and Norvic International Hospital in Kathmandu, have integrated clinical pharmacy services into their operations. Despite this, the cadre of clinical pharmacists in these facilities remains sparse. These professionals are primarily engaged in procurement, distribution, store management, and other essential hospital pharmacy functions.

In Nepal, fundamental clinical pharmacy services are either absent or provided with limited proficiency to a restricted number of patients or units within hospitals, contingent upon physicians who opt to involve pharmacists in clinical roles. The provision of comprehensive pharmaceutical care plans by pharmacists is currently non-existent. In 2015, the Ministry of Health and Population (MOHP) promulgated the ‘Hospital Pharmacy Guideline 2072,’ advocating for one clinical pharmacist in

hospitals with 51-100 beds to offer clinical pharmacy services. This guideline heralded a promising development for the recognition of clinical pharmacy services in the nation. However, its implementation has been inconsistent, particularly in government-operated hospitals. As the paradigm of clinical pharmacy gradually gains acknowledgement in Nepal, there are burgeoning prospects for clinical pharmacists in both public and private sectors. Presently, PharmD graduates and M. Pharm degree holders from various universities are engaged in hospital pharmacies as managers and academic faculty, though they seldom practice as clinical pharmacists in private tertiary care hospitals. Regrettably, the remuneration for clinical pharmacists is considerably low, prompting many to seek employment in the Middle East or in other sectors where compensation is more lucrative.

Despite their critical role in enhancing patient outcomes, clinical pharmacy services face numerous challenges. Issues stem from deficiencies in pharmacy education, including curriculum content, workforce availability, and infrastructure, as well as from problems within the practice environment. Additionally, there is a lack of awareness among the general public, a

negative attitude from some pharmacists, and communication gaps between pharmacists. Other significant challenges include the discontinuity of services, poorly defined roles and responsibilities for pharmacists in hospitals, and a lack of recognition and acceptance by other healthcare professionals. The perspectives and opinions of doctors regarding the roles and responsibilities of pharmacists are crucial factors influencing the development of clinical pharmacy services in hospitals.

The recognition of clinical pharmacy services by the Government of Nepal indicates that it can be an integral part of health care services within the country. However, as pharmacy education in the country is more oriented towards industry and graduate pharmacists are unable to perform patient care and related clinical pharmacy services in the hospitals, it is a challenging task to uplift the fledgling clinical pharmacy services. Educational institutes should build their capacities for imparting skills to their students and for better experiential training opportunities through qualified and competent clinical preceptors. International collaborations and accreditation of educational programs for the betterment of the clinical pharmacy may be the way forward.

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Continuing Pharmacy Education: Enhancing Professional Competency in Nepal



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Pharmacists are integral to healthcare, necessitating continuous development to uphold high standards of pharmaceutical care. In Nepal, as in many countries worldwide, this ongoing professional development is facilitated through Continuing Pharmacy Education (CPE). CPE is crucial for ensuring pharmacists remain abreast of advancements in therapies, technologies, and patient management approaches.

What is Continuing Pharmacy Education (CPE)?

Continuing Pharmacy Education (CPE) encompasses structured educational activities designed to support pharmacists in maintaining and enhancing their competence throughout their careers. These activities include workshops, seminars, online courses, and practical training sessions aimed at updating pharmacists on new medications, treatments, regulations, and patient care strategies. CPE fosters critical thinking and problem-solving skills, ultimately improving patient outcomes and advancing the pharmacy profession.

Importance of Continuing Pharmacy Education (CPE)

CPE is indispensable for pharmacists to adapt to evolving healthcare practices and patient needs. According to the Accreditation Council for Pharmacy Education (ACPE), CPE ensures pharmacists remain competent, in providing quality pharmaceutical care and effectively navigating changes in the healthcare landscape. In Nepal, where historical emphasis on theoretical knowledge has sometimes overshadowed practical application, CPE serves as a pivotal bridge, preparing pharmacists to tackle real-world challenges effectively.

Current Landscape of Pharmacy Education in Nepal

Pharmacy education in Nepal has evolved significantly since its inception in the 1970s, with various universities offering undergraduate and postgraduate programs. However, practical training components have often been limited, resulting in a workforce that may lack essential hands-on experience critical for effective patient care.



Furthermore, the operation of many community pharmacies without registered pharmacists underscores the urgent need for standardized training and robust regulatory oversight.

Initiatives in Continuing Pharmacy Education (CPE)

Efforts to introduce CPE in Nepal have gained momentum in recent years, albeit gradually. The hospital pharmacy at Chitwan Medical College Teaching Hospital (CMCTH) pioneered a CPE program in mid-2016 in collaboration with the hospital's Health Professionals Education and Research Center (HPERC). This initiative aimed to enhance professional capabilities by offering ongoing training and education opportunities tailored to the needs of practicing pharmacists.

Challenges in Implementing CPE Programs

Despite commendable initiatives, several challenges impede the widespread adoption of CPE in Nepal. Significant barriers include time constraints, heavy workloads, and limited resources. Moreover, the absence of stringent policies mandating CPE for pharmacists has led to sporadic and irregular program implementation.

The prevalence of community pharmacies operating without trained pharmacists further complicates efforts to standardize pharmaceutical care across the country.

Prospects and Recommendations for Future Development

Looking forward, substantial opportunities exist to strengthen CPE in Nepal. The Nepal Pharmacy Council (NPC), tasked with regulating pharmacy education and licensure, holds a pivotal role in mandating and standardizing CPE programs nationwide. Collaboration with international organizations and neighboring countries with established CPE frameworks promises invaluable insights and support in developing robust educational modules tailored to local needs.

Conclusion

Continuing Pharmacy Education (CPE) stands as a cornerstone for the professional growth of pharmacists in Nepal. By addressing current disparities between theoretical education and practical application and ensuring ongoing competency through structured CPE programs, Nepal can significantly elevate its pharmaceutical care standards. Effective collaboration among stakeholders—regulatory bodies, educational institutions, and healthcare providers—is imperative for the successful implementation and promotion of CPE initiatives.

This concerted effort will not only enhance pharmacists' skills and knowledge but also improve patient outcomes and fortify the healthcare system holistically.

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Ayurvedic Formulations: An Ancient Wisdom for Modern Health



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Introduction

Ayurveda, an ancient system of medicine originating in India over 5,000 years ago, emphasizes holistic health through a balance of mind, body, and spirit. Rooted deeply in the Vedas, particularly the Rigveda and Atharvaveda, Ayurvedic medicine incorporates natural remedies and preventive care. Central to Ayurveda are its formulations carefully crafted combinations of herbs, minerals, and other natural substances designed to promote health and treat various ailments. The Rigveda introduces foundational concepts such as the medicinal use of plants and the importance of divine healing deities like the Ashvins. Meanwhile, the Atharvaveda expands on these principles with detailed descriptions of herbal medicines, surgical practices, and methods for maintaining physical and mental well-being. These ancient texts continue to influence modern Ayurvedic practices, providing a timeless guide for personalized health and holistic healing.

The Philosophy behind Ayurvedic Formulations

Ayurvedic formulations are based on the principles outlined in ancient texts such as the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya. These texts emphasize the concept of balance among the Panchamahabhutas Earth, Water, Fire, Air and Ether (Space) and three doshas Vata, Pitta, and Kapha each representing different bodily functions and elements.



- **Vata:** Associated with air and space, Vata governs movement, breathing, and the nervous system. Composed of Air and Ether.
- **Pitta:** Linked to fire and water, Pitta controls digestion, metabolism, and energy production. Composed of Fire and Earth.
- **Kapha:** Related to earth and water, Kapha maintains bodily structure, fluids, and immunity. Composed of Earth and Water.

Ayurvedic practitioners create formulations tailored to an individual's unique constitution (Prakriti) and current imbalance (Vikriti), aiming to restore harmony and health.

Types of Major Ayurvedic Formulations

1. Churna (Dry Powder): Churnas are finely powdered mixtures of dried herbs and minerals used in Ayurveda for their therapeutic benefits. They can be mixed with water, honey, or ghee for consumption. Triphala Churna, a well-known formulation, combines three fruits Amalaki (*Phyllanthus emblica*), Bibhitaki (*Terminalia bellirica*), and Haritaki (*Terminalia chebula*) known for their digestive and detoxifying properties. Triphala Churna supports gastrointestinal health, aids in digestion, and promotes regular bowel movements.

2. Vati (Tablet/Pill): Vatis are concentrated herbal extracts compressed into tablet or pill form for easy consumption. They are designed to deliver potent doses of medicinal herbs. For example, Gokshuradi Guggulu combines herbs like Gokshura (*Tribulus terrestris*) and Guggulu (*Commiphora wightii*), traditionally used to support kidney function, urinary tract health, and promote overall detoxification. Vatis are convenient for precise dosing and are often used to address specific health concerns.

3. Asava and Arishta (Fermented Liquids): Asavas and Arishtas are herbal decoctions fermented with natural sugars, enhancing

their medicinal properties and shelf life. Ashwagandharishta, for instance, contains Ashwagandha (*Withania somnifera*) and other herbs known for their adaptogenic and rejuvenative qualities. This fermented tonic helps to boost energy levels, reduce stress, and support overall vitality. Asavas and Arishtas are widely used in Ayurveda for their digestive, carminative, and tonic effects.

4. Ghrita (Medicated Ghee): Ghrita refers to clarified butter infused with medicinal herbs, revered for its therapeutic benefits in Ayurveda. Brahmi Ghrita, infused with Brahmi (*Bacopa monnieri*), is renowned for its ability to enhance cognitive function, improve memory, and promote overall brain health. Ghrita formulations are valued for their ability to deliver the healing properties of herbs while nourishing the body and balancing the doshas (Vata, Pitta, Kapha).

5. Taila (Medicated Oil): Tailas are herbal oils infused with potent herbs and used for massage and external application. Mahanarayan Taila, containing herbs like Dashamoola (a blend of ten roots), is specifically formulated to alleviate joint pain, stiffness, and muscular inflammation. Tailas penetrate deep into the tissues, promoting circulation, easing tension, and nourishing the skin. They are integral to Ayurvedic therapies such as Abhyanga (Ayurvedic massage) and Panchakarma (detoxification treatments).

6. Kashayam (Decoction): Kashayams are boiled mixtures of herbs,

typically consumed as liquid extracts. Dashamoola Kashayam, composed of ten roots including Bilva (*Aegle marmelos*), Agnimantha (*Premna integrifolia*), and Shyonaka (*Oroxylum indicum*), is valued for its anti-inflammatory properties and is used to treat various inflammatory conditions, joint disorders, and fevers. Kashayams are prepared by boiling herbs to extract their active constituents, making them potent and effective for therapeutic use.

7. **Avaleha/Lehyam (Herbal Jam):**

Lehyams are thick, sweet formulations made by cooking herbs with jaggery (unrefined cane sugar) or honey. Chyawanprash, a renowned Ayurvedic tonic, combines Amla (Indian gooseberry), known for its high Vitamin C content, with other rejuvenative herbs like Ashwagandha and Guduchi (*Tinospora cordifolia*). Chyawanprash supports immune function, respiratory health, and overall vitality. Lehyams are cherished for their nutritive value, pleasant taste, and ability to strengthen the body's defenses.

8. **Bhasma (Calcinated Powder):** Bhasmas are finely powdered minerals and metals purified and processed through calcination, a specialized Ayurvedic technique. Swarna Bhasma (gold ash), prepared from purified gold, is used in minute quantities for its rejuvenative properties. It is believed to enhance vitality, improve immunity, and promote longevity when prepared and administered under strict Ayurvedic guidelines. Bhasmas are highly potent formulations, requiring precise preparation and dosage for therapeutic benefits.

Preparation and Quality Control

The preparation of Ayurvedic formulations is an intricate process requiring deep knowledge of herbal pharmacology and precise methods. Raw materials are meticulously selected and processed according to traditional methods to preserve their therapeutic qualities. Modern Ayurvedic pharmacies adhere to Good Manufacturing Practices (GMP) to ensure product safety and efficacy.

Benefits of Ayurvedic Formulations

1. **Holistic Healing:** Ayurvedic formulations address the root cause of ailments, not just symptoms, promoting overall health.
2. **Natural Ingredients:** Made from natural herbs and minerals, they generally have fewer side effects compared to synthetic drugs.
3. **Preventive Care:** Regular use of certain formulations can strengthen immunity and prevent diseases.
4. **Personalized Treatment:** Formulations are tailored to individual needs, providing customized healthcare solutions.

Challenges and Modern Adaptations

While Ayurvedic formulations offer numerous benefits, they face challenges in terms of standardization and scientific validation. However, modern research is increasingly validating the efficacy of many Ayurvedic remedies. Integrating Ayurvedic wisdom with contemporary scientific methods holds promise for advancing holistic healthcare.

Conclusion

Ayurvedic formulations represent a profound heritage of natural healing, offering time-tested remedies for modern health challenges. As interest in holistic and integrative medicine grows, Ayurveda's ancient wisdom continues to provide valuable insights and solutions for achieving balanced health and well-being. By embracing and validating these traditional practices, we can enrich our healthcare systems and promote a more comprehensive approach to wellness.

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POEMS

EXPLORING CREATIVITY

Let's ride with the rhythm

THE TRIBUTE TO PHARMACISTS



Ravi Krishan Sah
First Semester, B.Pharm.

Pharmacists, a lamp of light,
Guiding us through the darkest night.

Their ethics are pure as rainwater
Which is priceless, and can not be purchased by any investor.

From prevention to cure, they know it all,
A safety net, they never let us fall.

Relationship of pharmacist & patient is as strong as a sigma bond,
Patients come with stories untold, in pharmacists, they find a
heart of gold.

In the white apron, they stand tall,
Answering the sick & weak's calls.

Mixing potions, counting pills,
Crafting remedies for countless ills.

With every prescription, they provide hope & health side by side,
So here's a salute to those who care,
For every pill, each thoughtful prayer.

In the realm of health, they stand tall,
Dear pharmacists, we thank you all.

फर्मासिस्ट



Amrita Sapkota
Third Semester, B.Pharm.

रङ्गीएका बिरामीका भावनामा
लेखिएका ऊनका दुःखहरु
चोटजस्तै मिसिएका दर्दनाक कहानी,
निको हुने आशाहरु,
आज पूर्ण हुने एऊटा आधार
फर्मासिस्ट ।

Dose देखि counseling सम्म,
Tablet देखि suppository
Ayurved देखि allopathy सम्म,
चलिरहेको स्वास्थ्य क्षेत्रमा
ऊसको पनि त भूमिका छ ।

स्वास्थ्य क्षेत्र र उ आफैमा परिपूरक छन्
एक बिना अर्को अपुर्ण र अधुरा ।

कयी निर्दोषहरुको नाममा
मारिएको मेरो देशका कानुन,
राखिएका नातेदार, आफन्त कै भरमा
चलिरहेका औषधि पसलेहरु
आफैमा लज्जास्पद छन्,
Real फर्मासिस्टहरु।

ऊनिहरुलाई थाहा नै छैन
Narcotics antibiotics,
Resistance र side effects,
मानौ chocolate जस्तै देखिएका
ऊनिहरुलाई पनि लाग्छ होला?
पैसा भएपछि जे पनि आऊने
बिना prescription?
चाहे 'क' (control medicine),
चाहे 'ख' (prescription only),
चाहे 'ग' (over the counter
medicine),

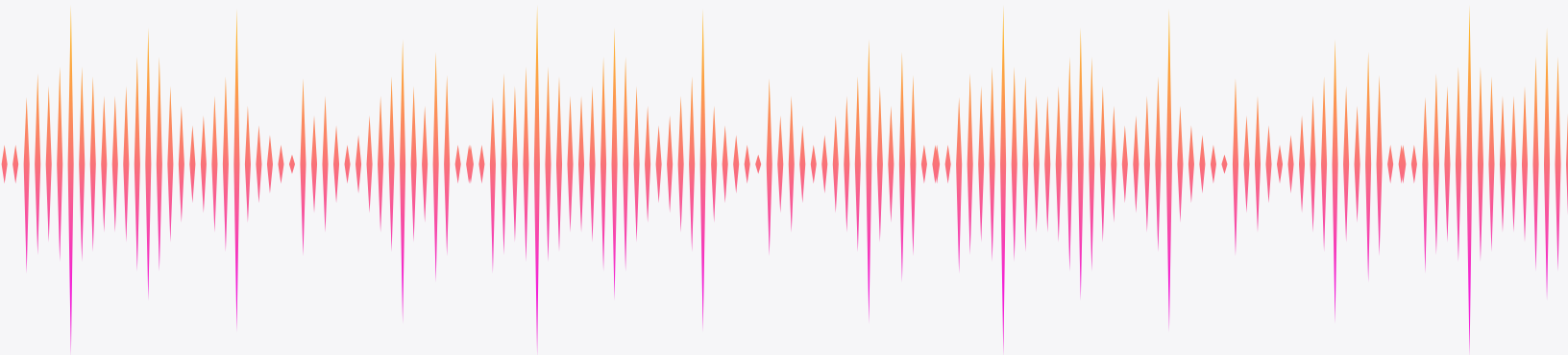
म अठोट गर्छु, बदलिन्छु ।
यदि म बदलिदिन्छु त ऊ बदलिन्छ,
अनि देश बदलिन्छ। कानुन बदलिन्छ
स्वास्थ्य क्षेत्र बदलिन्छ निःशुल्क औषधि
वितरण गर्ने सपना, धस् सपना बन्ने छैन
विपनाका आकार में बदलिनेछ जसरी
capsule का आकार ले रोगको आकार
बदलिदिन्छ।

INTERVIEW



WITH

ALUMNI



ALUMNI INTERVIEW



Mahesh Upadhyay

Industrial Pharmacist / Pharmapreneur
Chief Managing Director
Toreva Pharmaceuticals Pvt. Ltd.

1. Can you tell us a bit about your journey since graduating and what led you to a career in the pharmaceutical industry?

Back in my school days, I was always fascinated by medicines and their impact on health which finally led me to pursue Bachelor in Pharmaceutical Science from Pokhara University. I completed my Bachelor's in 2006 AD and immediately got an opportunity to join Quest Pharmaceuticals at Birgunj. I was always keen to know the overall process of medicine manufacturing. I always believed that academic backup is a must to succeed in the professional world and to develop skills in the right direction, hence, I always carried books related to Pharmaceutics and medicine manufacturing processes with me while I worked. This technique went so perfectly that, I could change various ongoing processes in a better way.

I personally love challenges. This character pushed me to accept a role to lead the production department in one of the

pharmaceutical startup in just 2 years. My intrinsic character, skills and love for the profession enabled me to produce expected outcomes there, however, something inside me did not let me settle. A quench to master the role of R&D expert pushed me to accept a very challenging role. I moved to a company which had a dire need for technical inputs where I got a sole opportunity to develop new products, troubleshoot prevailing ones and streamline the entire production line. This was in fact the scariest decision I had ever taken till then. This was like leaving my comfort zone at a blazing speed.

With focus and streamlining energy in the right direction, my team and I were very successful in breaking all the targets that we had taken for ourselves. During this aforementioned journey, a spark to build a Pharmaceutical company by myself and to provide a platform for many jobs slowly developed inside my mind. This got so strong that I started planning and team building since then.

This got imprinted on my subconscious mind.

At the same time, I got a scholarship to pursue a Master in Pharmacy at Wonkwang University, Korea. An inside call to experience the working culture and experience the technology led me to join a Pharmaceutical Company in South Korea as well, however, for a brief amount of time. After graduating and returning back to Nepal in 2015 AD, I immediately joined as a factory head and was promoted to General Manager in a startup Pharmaceutical, where my team created a record in manufacturing the maximum number of products in the launching year. Joining this company was deliberate as I needed the experience to build a company from scratch to launch its products. This was managed by my subconscious mind in disguise. Within this period, I had my Master's Degree and more than a decade of experience and a plan to start a Pharmaceutical company in Nepal. I pitched my idea to close people who believed in me and joined the idea to create Toreva. So, this marks the beginning of my Pharmapreneur journey, a second chapter of my life.

2. Looking back at your time in SHAS, are there any specific experiences or mentors that significantly impacted your career path?

Yes of course. All the teachers and professors motivated me to study not just

to score but to understand as well. I profoundly remember scores of my first semester which were not upto the mark. I was called by Professor Natasa Skalko Basnet who showed how much she believed in me and also motivated me. I cannot explain the moment, but I don't know why things changed within me and hence I was a changed man. I started scoring very well and finally was awarded a Dean's List student in Bachelors. Also, a day of Dr. Purusottam sir's lecture had created a positive impact on me. He spoke on the employment and the containment one gets when he/she provides employment in his home country. Maybe, this also has led me to establish a Pharmaceutical company and provide an ambient working culture in Nepal itself.

3. The pharmaceutical industry is known for its complexity and stringent regulatory environment. How would you describe your experience as an industrial pharmacist after spending more than a decade in this field?

From 2006 to 2014, I am fortunate to witness many positive and constructive changes in this field. The number of industries has grown from thirties to more than a hundred. The Nepalese industries have not only grown in number but also have profoundly improved in the produce quality through stringent Quality Management Systems and also have immensely invested to introduce cutting-

edge technology and implement avant-garde concepts in enhancing the quality. Not only in the private industrial sector, the development and metamorphosis is also clearly observed in the regulatory sector as well. The reliance on imports has also decreased and the domestic shares have increased. But, we still need to work on specialized dosage form production like vaccines and implants where we 100% depend on import.

4. For students interested in pursuing a career in the industry, what key advice would you offer in terms of skills development and preparation?

First, get your mind sorted when you are still at your Pharmacy School. Identify your interest and if you find that you align and entice learning medicine manufacturing process, you may think about pursuing a career in Industry. Industry seems boring at the beginning when you join as you will have the most restricted working zone. The industries are usually in isolated areas and you might be restless. Patience and perseverance are the two key components needed to be a successful Industrial Pharmacist. During your studies, have a solid understanding of subjects like Pharmaceutics, Unit designing, Unit Operations, Drug dosage forms, Industrial Pharmacy and master your calculation skills. Develop yourself in decision-making and also creative thinking.

Have patience and believe in the process. Pay attention to your practicals as they are the first step to getting acquainted with instruments that we actually use in industry for R&D and in-vitro analyses. Choose and plan your Project work that aligns with the work that is done in industries, especially formulation and analyses. Make networks with seniors who are in industries and try participating in events that involve industry and pharma colleagues. Finally, get yourself ready to crack the registration exam in one go.

5. What inspired you to take the leap and start your own pharmaceutical company?

I have been interested in medicine since childhood and the idea of providing employment was instilled during my Bachelor's degree. These two factors are the major contributors for me to initiate my pharmaceutical industry. Moreover, I always thought about Nepal having pharmaceutical companies led and run by a technical person, especially Pharmacists. Hence, these three contributing factors motivated me to start my own company.

6. Is there anything you wish you knew when you were starting out in the pharmaceutical world that you'd like to share with our readers?

Yes, for persons having plans like me and

coming from a technical background, a lack of management skills is a big setback. Hence, students planning similarly should also plan to upgrade themselves in the management and planning stream.

Also, most importantly, I suggest students to develop themselves to build capacity in making decisions.

7. As a successful pharmapreneur, what message do you have for current students who aspire to follow a similar path as yours?

Just believe in yourself and dream high.

ALUMNI INTERVIEW



Nissa Parajuli

Pharmacy Officer

Logistic Management Section
Department of Health Services

1. Can you elaborate on your journey from being a pharmaceutical sciences student at Pokhara University to becoming a pharmacy officer for the Government of Nepal?

I believe everyone has their own journey in life, and so was mine. I was a student of Bachelor in Pharmaceutical Sciences at Pokhara University, School of Health and Allied Sciences from 2013-2017 A.D. After my graduation, I joined Kathmandu University, School of Sciences to pursue my master's degree in Industrial Pharmacy from 2018-2020. And, as we all know COVID-19 pandemic hit us all in 2020. During my 2nd year at Kathmandu University, I was already working for the Pharmaceutical Industry as a Research and Development Officer at Bhaktapur. I worked as an R&D Officer during the first COVID-19 pandemic wave. Then, after that, as the opportunity came to get into the governmental sector back home, I grabbed it to be at home after the roller coaster experience of COVID-19.

2. What motivated you to choose a career in the governmental sector over other opportunities?

I initially joined the government sector on a contract basis to be closer to home after the pandemic, which was an emotional decision. But after joining the governmental sector and seeing how majorly can it impact the decisions and bigger picture of the public health context of the country, it motivated me to be a part of the change that we can bring being in the government sector.

3. Given your experience in both research and government service, what aspects of each role do you find most rewarding?

My experience in research and development was my first job and learning new things, studying research articles and then formulating dosage forms with trials and errors was quite exhilarating for me.

Also, I feel lucky that I got my first job as an R&D Officer who could try out formulations and also analyze them. So, I believe that scaled both of my theoretical and practical knowledge in the subject matter.

Moving on from R&D to the governmental sector was relatively challenging as the R&D sector is purely technical while working in the provincial Ministry and Departments requires a combination of technical knowledge as well as managerial skills. Also, in the governmental sector, one has different roles in different organizations based on the organization's TOR, so I believe experiencing new things and new roles and dealing and solving issues that one hadn't thought of a week ago is itself an achievement.

Overall, I believe working in R&D has increased my technical skills and working in the governmental sector has increased my human and managerial skills.

4. As a Pharmacy Officer at the Department of Health Services, what are your core responsibilities?

I am currently working as a pharmacy officer in the Logistics Management Section of the Department of Health Services and my core role is to provide ideas, knowledge and feedback regarding the plans and policies of the logistics cycle. Along with that I also support in developing specifications, procurement cycle and good storage of medicines till they are distributed to the desired sites.

And, as I am the team lead for Cold Chain and Vaccine Management, my utmost role is to communicate with partners, receive, store and distribute and manage all aspects of the routine, Covid-19 and emergency vaccines which are distributed by the government for free.

The logistics that DoHS gets is for free distribution to health facilities. As a Pharmacy Officer of DoHS, ensuring that the logistics (national immunization program, medicines and emergency vaccines such as Anti-rabies vaccine) are adequate, of good quality and timely definitely supports the public health program of the country as there is a saying "No Commodities, No Program" which indicates that the program fails if the commodities fail.

5. Do you have any plans to return to the research and development side of pharmaceuticals in the future?

Currently, I have no such plans to return to the research and development side of pharmaceuticals. But let's see what the future holds for me.

6. Looking back, is there anything you wish you had known or done differently during your academic journey at SHAS to better prepare for your current career path?

I am thankful to SHAS for the beautiful journey that I have had. I am also grateful beyond words to my teachers and seniors

for being so kind and helpful that I always felt SHAS was a home to me. The only thing I wish I had known more is the knowledge and the workings of the government system and the programs it has for the betterment of public health.

7. What advice would you give to students interested in pursuing a career in pharmacy, particularly those interested in government service?

I do not believe I have as much experience to advise my fellow juniors but if you are interested in working in the government services, know the functionality and terms of reference of each organization which will help you better prepare for it. One other thing, learning Nepali typing always helps!

MESSAGE TO JUNIORS



Sushma Pantha
BPharm, 19th Batch

Dear juniors,

Welcome to pharmaceutical sciences, where you'll learn that "Rx" stands for "Really eXciting" (or maybe "Really eXhausting"). Get ready to juggle chemical formulas, lab works, late-night studies and much more drug names. But do not forget to laugh during the journey- after all, laughter isn't FDA-approved, but it's definitely effective. Best of luck, and enjoy the adventure ahead!

Cheers!

Dear juniors,

As you begin this exciting academic adventure, remember that every big success starts with the courage to take the first step. View every challenge as a chance to learn and grow. Your dedication and determination will help you reach your dreams.



Sawana Rajbhandari
BPharm, 19th Batch

MESSAGE *TO* JUNIORS



Prakriti Gurung
BPharm, 19th Batch

Dear juniors,
Never lose hope , stay curious , work hard and enjoy the journey! 'You are capable of doing amazing things.'

Dear juniors,
Embrace every challenge, learn continuously, and don't forget to have fun. Success awaits you!



Pabitra Ranabhat
BPharm, 19th Batch



Ganesh Paneru
BPharm, 19th Batch

Dear juniors,
Focus on your goals, collaborate with peers, and never stop learning. The future is bright!

Dear juniors,
Welcome to the new journey! you've made the right choice. Just study well, accept challenges, be confident, do some extracurricular activities but don't forget to have fun. Come back to me in case you need any help.



Shanti Chhantyal
BPharm, 19th Batch

MESSAGE TO JUNIORS



Binayak Adhikari
BPharm, 19th Batch

Dear juniors,
Your dedication and passion will pave the way for your success. Embrace every opportunity to learn and grow, and never hesitate to seek guidance. Cherish every moment of your pharmacy journey. Embrace challenges, seek knowledge, and never hesitate to ask for help. Your hard work and passion will lead to success.

Surround yourself with positive and supportive people. Collaborate, network, and never hesitate to ask for help when you need it.



Archana Pantha
BPharm, 19th Batch



Arati Regmi
BPharm, 19th Batch

Embrace the challenges. Make mistakes and learn from it. Stay curious and focus on your goals. Enjoy your university journey.

Remember, every great achievement starts with the decision to try. As juniors, you're at the beginning of an incredible journey filled with opportunities to learn, grow, and excel. Embrace challenges, stay curious, and never underestimate the power of perseverance. Your hard work and dedication today will pave the way for a brighter, successful future. Believe in yourself, and keep pushing forward!



Suraj Poudel
BPharm, 19th Batch

WALL OF FAME

Pokhara University Sports Meet



Winner: Eighth Sem Mix Team
SHAS Football Tournament



Winner: The Defenders
SHAS Boys Cricket Team



Winner: Fourth Sem
SHAS Basketball Team

WALL OF FAME



Biobrain Battle organised by PUPTAS
Second Position : BPharm Fourth Semester
Susam Neupane, Sadhana Yogi, Ajit Bhandari



Pharmacy Day Poster Competition:
Winner: Aarohi Kushwaha
BPharm, Sixth Semester



Hair Donation for Cancer Patients
Sobit Baral
BPharm, Fourth Semester

BATCH PHOTOS



19th Batch

20th Batch



21st Batch



BATCH PHOTOS



22nd Batch



23rd Batch

PHOTO GALLERY

WHAT A YEAR!









MEET THE EDITOR

Having a great love for reading and a keen eye for details, I was committed to bringing great articles and inspiring alumni stories for this edition of Pharmaspirit. The unwavering support that we received from all of you was our driving force to bring this magazine to life. I hope you enjoyed reading this issue as much as we enjoyed preparing it!

SUSAM NEUPANE

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MEET THE DESIGNER



"I am pleased to share the final version of our pharmacy magazine. Your contributions have made this publication exceptional. Thank you everyone for your support and dedication throughout this project."

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Thank You



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