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Number of research papers published per teacher in the Journals notified on UGC website during the last five years

Academic Year	No. of Research Papers
2022	17
2021	10
2020	15
2019	04
2018	04
2017	01




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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
Evaluation of Phytochemical, Antidiarrheal and Antimicrobial Properties of Tinospora cordifolia in Albino Rats	Usha Verma Seema Gupta	Pharmacology Pharmacognosy	International Journal Of Pharmacy & Pharmaceutical Research	2021	2349-7203	https://ijppr.humanjournals.com/	https://ijppr.humanjournals.com/wp-content/uploads/2021/03/18.Usha-Verma-Seema-Gupta.pdf	pubmed, Google Scholar, Index Copernicus, CAS, ICMJE
Clarithromycin Loaded Chitosan Nanoparticles: Development and Characterization	Ashvini Herimatha*, Shivanand K. Mutta, Anirbandeep Bose, Anudeep Balla	Pharmaceutics	Current Applied Polymer Science	2021	Print ISSN 2452-2716 Online ISSN 2452-2724	www.eurekaselect.com	https://www.eurekaselect.com/doi/10.1533/3-642-06888-1	SCOPUS,
preparation, antimicrobial evaluation and standardisation of polyherbal formulation	zeeshan afsar, s. Naveen kumar B.J. Mahendra kumar, A.S. Aravind	pharmacognosy	Asian Journal of Phytomedicine and clinical Research	2021	2321-0915	www.ajprjournal.com	https://www.academia.edu/57175878/PREPARATION_A_NTIMICROBIAL_EVALUATION_AND_STANDARDIZATION_OF_POLYHERBAL_FORMULATIONS	googlr scholar, cross ref, indian citation index, CAS, Pubmed, DOAJ
A STUDY ON PRESCRIBING patterns of drugs in geriatric patients attending a tertiary care hospital	yalda hashemzadeh boneh, Dr. shailesh yadav	pharmacy practice	international journal of pharmaceutical science	2021	2319-670x	www.ijpsi.org	https://ijpsi.org/Papers/Vol10(5)/D110053848.pdf	Google scholar, CAS
Drug utilization patterns in patients with acute exacerbation of chronic obstructive pulmonary disease at tertiary care hospital	Dr. sufair moopandakath, Dr. shailesh yadav, Dr. Manikanta B.D., Dr. md. Attullah khan	pharmacy practice	global journal for research analysis	2021	2277-8160	https://www.worldwidejournals.com/global-journal-for-research-analysis-GJRA/article/drug-utilization-patterns-in-patients-with-acute-exacerbation-of-chronic-obstructive-pulmonary-disease-at-tertiary-care-hospital/MiExMzA=	https://www.worldwidejournals.com/global-journal-for-research-analysis-GJRA/article/drug-utilization-patterns-in-patients-with-acute-exacerbation-of-chronic-obstructive-pulmonary-disease-at-tertiary-care-hospital/MiExMzA=	Google scholar, CAS, Pubmed, Crossref, NCBI
impact of covid-19 pandemic on the mental health of college students in india: cross-sectional web-based study	amar prasad chowdary, narayansah sonar, jamuna, moumita Banerjee, shailesh yadav	pharmacy practice	JMIRx	2021	e28158	https://jmirpublications.com/	https://www.semanticscholar.org/paper/Impact-of-the-COVID-19-Pandemic-on-the-Mental-of-in-Chaudhary-Sonar/caae559c30aa2f374b86bd36d83b3c4402ea316f	Crossref, DOAJ, open access, ORCID,
Liposomes –A Overview	Akshay Kumar Patel, Shivanand K. Mutta, Rajkumar Prasad Yadav	Pharmaceutics	Asian Journal of Pharmaceutical Research and Development	2021	ISSN: 2320-4850	https://www.ajprd.com/index.php/journal	https://ajprd.com/index.php/journal/article/view/934	Crossref,, open access,
Knowledge and Perception of Pharmacy Students about Generic Medicine in India: Web-based Cross-sectional Study	Amar Prashad Chaudhary,, Adna Nelson K., Narayan Sah Sonar, Jamuna TR	pharmacy practice	J Young Pharm	2021	p-ISSN -0975-1483, e-ISSN-0975-1505	https://jyoungpharm.org/	https://jyoungpharm.org/article/1612	Web of Science, Google Scholar, Health & Wellness Research Center, Health Reference Center Academic, Hinari, Index Copernicus, Indian Science Abstracts,
The Pharmacy Student's Knowledge And Perception About Generic Medicine: Web-based Cross-Sectional Study	Amar Prashad Chaudhary*, Adna Nelson K, S Mydhily, Chaitanya KJ, Jamuna TR	pharmacy practice	Int. J. Pharm. Investigation	2021	Print -2230-973X, Online -2230-9713	https://www.ijpionline.org/index.php/ijpi/issue/view/50	https://www.ijpionline.org/index.php/ijpi/article/view/1072	Emerging Sources Citation Index, Index Copernicus, Web of Science
Identification and Characterization of Unknown Impurity of Benzocaine in Lozenges	T. Menaka*, B. Ramya kuber1	pharmaceutic analysis	SSRN electronic journals	2021		https://www.ssrn.com/index.cfm/en/	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3892200	


Human Journals

Research Article


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Evaluation of Phytochemical, Antidiarrheal and Antimicrobial Properties of *Tinospora cordifolia* in Albino Rats



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Keywords: *Tinospora cordifolia*, phytochemicals, ciprofloxacin, loperamide, antimicrobial, antidiarrheal activity, castor oil

ABSTRACT

Tinospora cordifolia (Family Menispermaceae) commonly known as Amrita (Guduchi, Giloya) is widely used by tribals for the treatment of various infectious diseases. The plant also possess various pharmacological activities including its use as antihyperglycemic, anti-inflammatory, antiarthritic, antimicrobial, antiosteoporotic, enhance cognition (learning and memory), antidiarrhoeal and immunomodulatory effects. Our aim was to investigate the antidiarrheal, and antimicrobial activities of methanolic extract of *Tinospora cordifolia* (GURJO) in albino rats. The present study was carried out to study the phytoconstituents properties of *Tinospora cordifolia* leaf. *Tinospora cordifolia* leaf collected from nandidurg (nandi hills) in the south Indian state of Karnataka. Phytoconstituents screening revealed the presence of alkaloids, saponins, glycosides, carbohydrate, proteins and amino acids, phytosterol, phenol, flavonoids and diterpenes. The antidiarrheal effect was evaluated by using castor oil-induced diarrhoea, and gastrointestinal motility tests at 200 mg/kg and 400 mg/kg body weight in rats. The leaf extract showed considerable antidiarrheal effect by inhibiting 40% and 60% of diarrheal episode at the doses of 200 and 400 mg/kg, respectively. *Tinospora cordifolia* also significantly reduced the castor oil-induced intestinal volume in enteropooling test as well as intestinal transit in GI motility test, compared to their respective control. These observed effects are comparable to that of standard drug loperamide (3mg/kg). So these results indicate that bioactive compounds are present in methanolic extract of *Tinospora cordifolia* including significant antidiarrheal activity, and antibacterial activity could be accounted for pharmacological effects. The results will be calculated using statistical analysis by applying Anova and student t-test. P value for all was found to be <0.01. Thus it was observed that extract was having a highly significant antidiarrheal and antimicrobial effect as evident from the p-value. Traditionally people used *Tinospora cordifolia* for the treatment of various ailments, including diarrhoea.



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Network Article

Clarithromycin Loaded Chitosan Nanoparticles: Development and Characterization

Author(s): Ashwini Herimath, Shivanand K. Murta, Anirbandeep Bote and Anurdeep Batta

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Abstract

Background: Chitosan nanoparticles have been extensively studied and used due to their well-recognized applicability in various fields. Chitosan, a natural polysaccharide polymer, is extensively used in pharmaceuticals to deliver a wide variety of therapeutic agents. Chitosan is a biocompatible and biodegradable mucosubhesive polymer that has been extensively used in the preparation of multi particles, particularly nano- and microparticles.

Objective: The main aim of the present study was to optimize the conditions for the preparation of chitosan nanoparticles to get optimal particle size, with optimal zeta potential and narrow polydispersity index and anti-bacterial activity.

Methods: Include the ionic gelation technique for chitosan nanoparticle preparation. The influence of formulation parameters and process parameters on the chitosan nanoparticles were investigated. Besides, the suspension stability of the prepared nanoparticles was also assessed on storage at 4°C.

Results: The formulation and process parameters showed a significant effect on the physicochemical and morphological characteristics of the chitosan nanoparticles. The chitosan nanoparticles prepared under optimum conditions (chitosan concentration of 0.5% w/v, CS: TPP mass ratio of 1:3, initial pH of chitosan solution of 4.5, stirred at 750 rpm for 30 min) had shown a mean particle size of 326.8 ± 15 nm, zeta potential of -28.2 ± 0.5 mV, and PDI of 0.21 ± 0.02 . The encapsulation of the clarithromycin slightly increased the polydispersity index, but the zeta potential of the unloaded nanoparticles was not affected while the particle size increased. Under optimum conditions, clarithromycin encapsulation efficiency into nanoparticles was found to be 70%. Additionally, chitosan- triphosphosphate nanoparticles were shown to be stable for a

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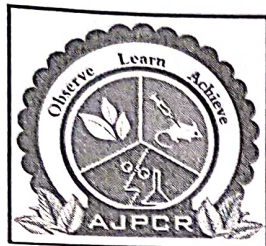
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PREPARATION, ANTIMICROBIAL EVALUATION AND STANDARDIZATION OF POLYHERBAL FORMULATIONS

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ABSTRACT

Objective: The present study was aimed to prepare various formulations, evaluate the antimicrobial efficacy, safety and stability of the prepared formulations and to standardize the formulations by various methods. **Methods:** The leaf and bark of the plants *Cassia fistula*, *Milletia pinnata*, *Ficus religiosa* and *Wendlandia thyrsoides* were extracted and screened for antimicrobial activity. The active extracts were used to prepare eight formulations. They were Cream, gel, hand wash, sanitizer, soap, tooth paste, tooth powder and mouth wash. The formulations were subjected to antimicrobial and phytochemical screening. The total phenolic and condensed tannin contents were evaluated. The HPLC and HPTLC fingerprinting was done using tannic acid and gallic acid as standards. The formulations were further subjected to skin toxicity studies on albino rats in order to evaluate the safety. Accelerated stability studies were done by exposing the formulations to variations in temperatures and evaluating the physico-chemical parameters for 120 days. **Results:** The methanolic bark extracts exhibited good antimicrobial properties. Phytochemical screening of the formulations revealed the presence of tannins and polyphenols. The HPLC and HPTLC fingerprinting exhibited peaks corresponding to the retention times and Rf values of the standards. Results of animal studies revealed that they were safe and did not produce any inflammation and oedema after 7 days. Accelerated stability studies confirmed that the formulations were found to be stable. **Conclusion:** The formulations were safe with good antimicrobial effects and they were found to be stable after 120 days of stability studies.

KEYWORDS

Antimicrobial, Standardization, Fingerprinting and Animal studies.

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INTRODUCTION

Plants are known to produce a variety of secondary metabolites which are proven to pose potential antimicrobial effects, thus making them a rich source of different types of medicines¹. Herbal medicinal products are of global importance both medicinally and economically. Although usage of these herbal medicines has increased, their quality, July – September

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A Study on Prescribing Patterns of Drugs in Geriatric Patients Attending A Tertiary Care Hospital

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Abstract :

Background: The population of geriatric patients is increasing as a result of increased life expectancy. India is ageing fast and currently the Geriatric population is about 7% of the total population. Geriatric medicine is the branch of gerontology which deals with clinical or medical aspect of gerontology.

Objectives: Primary objective: To evaluate the prescribing pattern in Geriatric Patients. Secondary objective: To determine the occurrence of Polypharmacy according to Beer's criteria. To check the Drug – Drug interaction of the common OTC Drugs.

Methodology: This study was conducted at Mallige hospital. Mallige hospital is a multispecialty tertiary care hospital with over 126 beds conveniently located in the heart of Bengaluru, the capital of Karnataka state of India. Mallige hospital consist of many departments like Nephrology, Cardiology, Radiology, General Medicine, Surgical, Paediatrics, Obstetrics & Gynaecology, etc. The study involves retrospective observational study. Study was conducted for 6 months in which data collection period for 3 months. Inclusion criteria: Patients above 65 years of either sex. Exclusion criteria: Patient who aren't willing to sign the consent form. Statistical analysis was performed using MS-excel and the result will be statistically analysed using appropriate statistical method.

Results: Out of 100 patients enrolled in the study from inpatient department, Majority of patients (42%) belonged to age group of 65-75 years. 52(52%) patients were males and 48 (48%) patients were females. Maximum number of prescriptions were having seven drugs (33%). Intravenous injections were the major formulations used for administration of drugs in geriatric patients (86.66%). The average number of days in the hospital was found to be between 6-10 days. It was observed that Diabetes mellitus in 22 (22%) followed by Systemic hypertension 16 (16%), and Ischemic heart disease in 12 (12%). Out of 557 drugs prescribed in the study, it was observed that Gastrointestinal drugs in 132 (23.69%).

Conclusion: The current study could assess the prescribing pattern of medicines in the geriatrics according to Beer's criteria 2015. The study report shows that the prevalence of PIMs is steadily increasing. In this study prescription pattern was not rational as there is polypharmacy, overuse and inappropriate use of drugs in geriatrics. The use of inappropriate medications can be avoided using the Beers criteria 2015, which is one of the important clinical tools which can be wisely used by physicians, pharmacists and health care providers. Polypharmacy and the prescription of PIMs constitute a major problem, especially when dealing with the elderly.

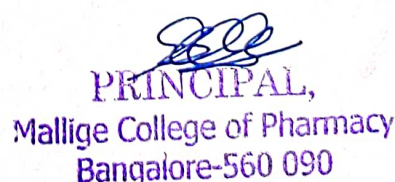
Keywords: Beer's criteria, geriatrics, Gastrointestinal drugs, Diabetes mellitus.

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I. INTRODUCTION

The population of geriatric patients is increasing as a result of increased life expectancy.¹ India is ageing fast and currently the Geriatric population is about 7% of the total population. Geriatric medicine is the branch of gerontology which deals with clinical or medical aspect of gerontology.² Polypharmacy and inappropriate prescriptions are prominent prescribing issues with elderly patients. Because of the following factors like; the physiologic changes of aging and potential drug–drug and drug–disease interaction; drug use in the elderly is fraught with many problems.³ These factors have been shown to be responsible for a disproportionately high rate of adverse drug reactions among elderly patients and its associated increased healthcare costs.⁴ Detecting adverse drug reactions among geriatric patients is challenging, as they often exhibit non-specific symptoms such as constipation, lethargy, light-headedness, confusion, falls and depression. Elderly patients commonly have multiple pathologies leading to polypharmacy, and altered pharmacokinetics and pharmacodynamics, are prone to adverse drug reactions from inappropriate medication.⁸ The most common influential factors of inappropriate prescribing include lack of adequate information regarding the correct





DRUG UTILIZATION PATTERNS IN PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AT TERTIARY CARE HOSPITAL

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Dr. Md. Attaullah Khan	MBBS, DTCD, DNB (RESP), FCCP (USA), (Consultant interventional pulmonologist) KMC Reg.No.58777, Mallige hospital, Bangalore-01.

ABSTRACT

Chronic obstructive pulmonary disease (COPD) has a worldwide prevalence of 10% and is among the first four causes of global mortality. 3-16% of patients with exacerbation must be hospitalized. Objectives of study are Primary objective; Evaluation of drug utilization patterns in patient with acute exacerbation of COPD in tertiary care hospital and Secondary objective: To correlate association of chronic obstructive pulmonary Disease with demographic details of patients, To assess the prescribing pattern of standard drugs in patients with exacerbation of chronic obstructive pulmonary Disease and To assess the health related quality of life (HRQOL) of the patients. The study was conducted at Mallige Hospital. Mallige Hospital is a multispecialty tertiary care hospital with over 126 beds, conveniently located in the heart of Bangalore. The study was conducted in the Inpatient department of the Hospital. A Hospital based prospective observational study was conducted. The study was done for six months with data collection duration for three months. Study population include patients admitted in Inpatient department of the Hospital. Inclusion criteria: Patients who are diagnosed as suffering from chronic obstructive pulmonary disease along with co-morbidities and who visited the hospital for acute exacerbation of the disease was included using diagnostic criteria such as ICD-10. Admitted for acute exacerbation of COPD of various etiologies and with or without co morbidities. Exclusion criteria: Patients in the IP ward admitted with diagnosis of COPD who are not willing to participate in the study. Patients who are admitted in comatose and unconscious condition and in an aggressive treatments. Patients who are under other chronic steroid use conditions. Prescriptions from pregnant women and with insufficient data are excluded. Out of 110 patients included in the study, 26 (23.63%) were females and 84 (76.36%) were males. majority 53 (48.18%) of them were found in the age group between 41-60 years, followed by 42 (38.18%) in the age group between 61-80 years, 11 (10%) in the age group between 18-40 years, then 4 (3.63%) were found between 61-80. Among 206 drugs prescribed for COPD patients 3 drugs were inappropriately prescribed. It was observed that Hypertension 66 (29.07%) followed by Diabetes mellitus 45 (19.82%), and Anemia in 32 (14.09%). Majority of the patients were of a low socioeconomic status. Most of the patients came under Types I and II grade of exacerbation (61.81% and 29.09%, respectively) as per the grading scale for exacerbation of COPD. This result showed tendency of polypharmacy with maximum number of prescriptions were having 6 drugs (37.2%). Intravenous were the major formulations used for administration of drugs in this study (36.98%). The present study represents the current prescribing trend for anti COPD agents. Despite the use of drugs according to the availability and physician's preference, it was found in the analysis that majority were in accordance with GOLD criteria recommendations. Most of the patients were only taking the medications offered at the hospital, and not buying the drugs from outside pharmacies, which were unavailable in the hospital. By including these drugs in the central purchase committee list of government, the treatment can be more effective and economy. Several guidelines have been developed worldwide for the management of exacerbation of chronic obstructive pulmonary disease, and these serve as reference standards for clinical practitioners. However, many clinicians practice their own prescribing pattern in treating COPD patients according to their clinical experience. Primary care physicians need to be empowered in appropriate and evidence-based management of exacerbation of COPD. A review of these prescribing patterns and guideline-based use of anti-COPD medications can give better insights into the concept of personalized, yet cost-effective pharmacological management of COPD.

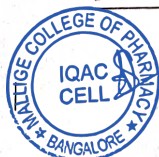
KEYWORDS : COPD, FEAI, Chronic, HRQOL, HADS, Exacerbation.

1. INTRODUCTION

Chronic obstructive pulmonary disease (COPD) has a worldwide prevalence of 10% and is among the first four causes of global mortality. In the United States, it affects 14.2 million people and 1.5 million annual visits to the doctor are registered for exacerbation.¹ In India, it is the 3rd leading cause of death and contributes a significant and growing percentage of COPD mortality which is estimated to be amongst the highest in the world; more than 64.7 estimated age standardized death rate per 100,000 amongst both sexes.² According to the analysis report of the 'Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in Adults' (INSEARCH) Phase I and II analysis, the prevalence of COPD in India were estimated to be 3.67%. The study population had rural and urban representation of both genders and the gender distribution shows that the prevalence in males and females was 4.46% and 2.86%

respectively. COPD possess an enormous burden in terms of morbidity, mortality, direct and indirect costs.¹¹ 3-16% of patients with exacerbation must be hospitalized. The mortality rate is close to 10%. The exacerbation of COPD produces loss of lung function, disease progression, increased morbidity and mortality, increased economic costs due to admissions to the Emergency Services and hospitalization.⁴⁵ The exacerbation of COPD is defined as an acute episode in the course of the disease, characterized by a worsening of the patient's symptoms, beyond the normal day-to-day variations, for which a change in medication is necessary.¹ 70% of the cases are secondary to an infectious process, 40-50% of bacterial origin, 30-40 viral and 10-20% mixed. In one third of patients, the cause of the exacerbation cannot be clearly identified (Table 1).³⁶ there is a complex interaction of multiple factors, including:

- The type of infectious agent.



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Original Paper

Impact of the COVID-19 Pandemic on the Mental Health of College Students in India: Cross-sectional Web-Based Study

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Authors' Response to Peer-Review Reports: <https://med.jmirx.org/2021/3/e32954/>

Abstract

Background: The COVID-19 pandemic has created a mental health crisis among college students in India due to lockdown restrictions, overwhelming numbers of COVID-19 cases, financial difficulty, etc. This mental health crisis has led to high degrees of fear, anxiety, and depression among college students.

Objective: The aim of this study is to investigate symptoms of fear, depression, and anxiety due to the COVID-19 pandemic among college students in India.

Methods: This cross-sectional web-based study was conducted using a Google Forms questionnaire. The Google Form included a sociodemographic questionnaire and psychometric scales evaluating the psychological and behavioral impacts of the COVID-19 pandemic. Thus, both qualitative and quantitative analyses were performed in the study.

Results: A total of 324 college students participated in this study, of whom 180 (55.6%) were male and 144 (44.4%) were female. After assessment of the psychometric scales, it was found that of the 324 students, 223 (68.8%) had high fear of COVID-19, 93 (28.7%) had moderate to severe depression, and 167 (51.5%) had mild to severe anxiety. Among the identified risk factors, having a family member who was infected with COVID-19 was significantly associated with anxiety and depression, with P values of .02 and .001, respectively. In addition, the correlations of the Fear of COVID-19 Scale with the Generalized Anxiety Disorder-7 scale and the Patient Health Questionnaire-9 were found to be 0.492 and 0.474, respectively.

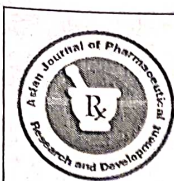
Conclusions: This research concludes that there is a very high fear of COVID-19 among students, along with anxiety and depression symptoms. This study also concludes that the Fear of COVID-19 Scale has a moderate positive correlation with the anxiety and depression scales, respectively.

(JMIRx Med 2021;2(3):e28158) doi: [10.2196/28158](https://doi.org/10.2196/28158)



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Review Article

Liposomes –A Overview

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ABSTRACT

Liposomes are sphere-shaped vesicles made up of one or more bilayers of phospholipids. The ability of delayed vesicles to transport medications, vaccines, diagnostic specialists, and other bioactive operators has accelerated development in the liposomal drug delivery system. The liposomal delivery system's pharmacoelements and pharmacokinetics properties have been altered, resulting in a higher therapeutic index and lower overall toxicity. There are many factors to consider, including size, size distribution, surface electrical potential, lamella count, and encapsulation efficacy. The use of surface modification in the development of liposomes with various mechanisms, kinetic properties, and biodistribution was discovered to be beneficial. Drug delivery, drug targeting, controlled release, and improved solubility have all been studied extensively with liposomes.

Keywords: Types of Liposomes, Mechanism of Liposomes, Drug Release, Evaluation of Liposomes, Application of liposomes

ARTICLE INFO: Received 13 Jan 2021; Review Complete; 21 Feb. 2021 Accepted; 20 May 2021 Available online 15 June. 2021



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INTRODUCTION

The aim of a novel drug delivery system is to have some control over drug release in the body, whether that control is temporal, spatial, or both. Novel drug delivery seeks to either sustain drug activity at a predetermined pace or reduce adverse side effects by maintaining a relatively steady, efficient drug level throughout the body. Liposomes are colloidal, vesicular structures composed of one or more lipid bilayers surrounding an equal numbers of aqueous compartments.¹ Liposomes range in size from the tiniest vesicle (diameter 20nm) to liposomes that can be seen under a light microscope and have a diameter of 1μm or greater, roughly equivalent to the dimensions of living cells. A liposome can transport drugs in one or three compartments (water soluble agents in the central aqueous core, lipid soluble agents in the membrane, peptide and small proteins at the lipid aqueous interface).² Membranes are usually made of phospholipids, which are molecules that have a head group and a tail group. Water attracts the head, while water repels the tail, which is made up of a long hydrocarbon chain. A liposome is a self-forming structure that consists of one or more concentric lipid bilayers

separated by aqueous buffer compartments and is an artificially prepared spherical vesicle composed of a lipid bilayer.⁴

Composition of liposome:⁴

Phospholipids:

These structures are mainly made up of phospholipids. PC also known as lecithin, is a biocompatible phospholipid present in plants and animals that is commonly used in liposomal preparation. Furthermore, other compounds, such as cholesterol, are also used in conjunction with phospholipids.

Cholesterol:

Cholesterol molecules in the membrane increases separation between choline head groups which reduces the normal hydrogen bonding and electrostatic interaction.



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Knowledge and Perception of Pharmacy Students about Generic Medicine in India: Web-based Cross-sectional Study

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ABSTRACT

Background: Globally, India being the largest provider of generic drugs, the students of all cadres of pharmacy need to have proper knowledge about generic drugs and their significance in the market, as well as in the lives of the consumers of the country. **Objectives:** The principal aim of this study is to compare and comprehend the knowledge and perceptions of B.Pharm, M.Pharm and Pharm.D students regarding generic medications. **Methods:** A cross-sectional web-based investigation was conducted for this study in September 2020. For this study, a semi-structured questionnaire of 22 items with four sections was constructed. They are the social demographic section, overall knowledge of generic medicine section, safety and efficacy of generic medicine section and the perception section. For this study, a quantitative analysis was carried out. **Results:** Significant difference exists in knowledge among these cadres regarding the marketing of generic medicine after the expiry of the patent right of innovator drug with a P -value of $<0.01^{**}$. It is found that there exists a difference in knowl-

edge regarding efficacy, adverse effects, and safety of generic medicine among these cadres with a P -value less than $<0.001^{***}$. While comparing the perception of these cadres about the generic drug, there is a statistically significant vast difference. **Conclusion:** This study finds a significant disparity in knowledge and perceptions of generic medications across B.Pharm, M.Pharm and Pharm.D students.

Key words: B.Pharm, M.Pharm and Pharm.D, Generic medicine, Branded medicine, Pharmacy.

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INTRODUCTION

According to the WHO, about half of Asia and Africa's population lacks access to essential medications. India's situation is not much better, with health care spending accounting for only 1.2% of GDP and a per capita health expenditure of USD 160, well below the OECD (Organization for Economic Cooperation and Development) average of USD 3484.¹ Drug prices are projected to account for two-thirds of total healthcare costs. According to Vandana *et al.*, medicines are out of reach for economically disadvantaged people in India.² One of the reasons for the lower economic segment of the population's lack of access to drugs is the exorbitant cost of branded medicines. To meet drug demand and reduce budgetary expenditure on drugs, the marketing of generic medicines is a viable alternative that is 20% to 90% less expensive than the brand-name counterpart.^{3,4}

The pharmacist is critical for generic medicine promotion because they are directly involved in the formulation and dispensing of the medication. Pharmacists' clinical activities have advanced significantly over the last decade to ensure the appropriate and economical use of medications.⁴ However, successful generic medicine utilization is only achievable when pharmacists receive proper training in generic drugs as part of their degrees.

In India, a variety of pharmacy degrees are available, including the Diploma in Pharmacy (D.Pharm), the Bachelor of Pharmacy (B.Pharm), the Master of Pharmacy (M.Pharm), the Master of Science in Pharmacy [MS(Pharm)], and the Master of Technology in Pharmacy [MTech (Pharm)], as well as the Doctor of Pharmacy (Pharm.D) and doctor of philosophy in pharmacy (PhD). The majority of students participate in B. Pharm and M.Pharm programs, which are primarily focused on the pharmaceutical industry.⁵ Students are increasingly interested in the

Pharm.D degree, which was introduced in 2008 as a clinically oriented pharmacy degree. These degrees include generic medicine subjects in their curricula, but they do not cover every facet of the field.

To the best of the author's knowledge, no similar research has been conducted in India to compare the knowledge and perception of generic medicine among diverse pharmacy cadres (B.Pharm, Pharm.D, and M.Pharm). As a result, the purpose of this study is to fill this knowledge gap by comparing B.Pharm, Pharm.D, and Mpharm students' understanding and perceptions of generic medicine.

MATERIALS AND METHODS

Study design and study period

In September 2020, a six-month cross-sectional web-based survey was conducted. This study engaged pharmacy students from Bangalore and other regions of South India who had access to the internet and were active on social media. This study adhered strictly to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) standards for reporting.^{6,7}

Development of questionnaire

A semi-structured questionnaire comprising of 22 items and divided into four sections was constructed for this investigation. The first segment featured four questions designed to elicit information about the participants' socio-demographic characteristics. Three sections contained a six-item multiple-choice questionnaire: general knowledge, knowledge about quality, safety, and efficacy, and perception. Strongly agree, agree, neutral, disagree, and strongly disagree were the options. All of these

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ABSTRACT

Background: The promotion of generic medicines in developing nation like India plays a crucial role in the availability of essential drugs for everyone. The main objective of this survey is to understand the knowledge and perception of the pharmacy student about generic medicine along with its safety and efficacy profile. **Methods:** The web-based cross-sectional study was carried out from September 2020 to February 2021 utilizing the Google form. The google form had four questionnaire sections, i.e., socio-demographic section, overall knowledge section, knowledge regarding safety and efficacy section, and perception section. **Results:** Most students believe they require additional knowledge regarding how bioequivalence tests are performed for generic drugs. Of 463 students, 419 students (88%) agree generic medicine is cheaper than branded medicines, and 339 students (73%) agree wider use of generic medicines in India helps in decreasing health care cost whereas 215 students (45%) are not aware generics are only marketed after the patent expiry of the branded medicine. Of 441 students, 127 students (27%) wrongly agree that generic medicines are less effective than branded medicine, and 196 students (43%) wrongly agree that generic medicine costs less because

they are inferior to branded medicine. Most pharmacy students believe doctors and patients should be given enough knowledge about generic medicine and that branded medicine use is influenced by advertisements. **Conclusion:** This study concludes that there is a gap in knowledge among pharmacy students about generic medicine. The responsible authorities should establish relevant curriculum revisions to increase students' knowledge about generic medications.

Key words: Branded medicine, Pharmacist, Pharm-D, Safety, Efficacy, Economical.

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INTRODUCTION

Medicines have been utilized throughout human history, but with the growth of knowledge, allopathic medicine has surpassed the limitations of traditional medicine. However, while allopathic medications are incredibly successful in managing disease and disorder, they are out of reach for one-third of the world's population and nearly half of Asia's population.^{1,2} The primary reason for limited accessibility is financial constraints. Branded medications are expensive, and to address this issue, generic medicines are placed on the market, which is 30%-70% less costly than branded medications.³ Not only is a generic drug a cost-effective alternative to branded medicine, but it also contributes to the reduction of off-patent branded medication prices.⁴

India's health care system has a mix of private and public components.⁵ The public sector is subsidized by the government, whereas individuals must pay for private health care. In India, only 42% of the population is admitted to public hospitals and 95% is treated with allopathic medicine, despite the fact that one-fifth of the population lives below the national poverty line.⁶ Due to the country's higher proportion of middle-class and poor people, the use of branded medicines increases the cost of the drugs, imposing an additional economic burden on the poor and middle-class. In low- and middle-income nations, pharmaceuticals account for between 20% and 60% of overall health spending.⁴ Thus, it is critical to promote generic medicines to increase accessibility, thereby lowering the cost of health care in India.

To improve the accessibility of generic medicine for poor people government of India started "Jan Ausadhi" initiative under which all

over India 3200 pharmacy stores exist which dispenses generic medicine, and the Medical Council of India (MCI) has recommended every doctor to prescribe generic medicine.⁷ The Government of India also ensured the quality of generic medicine by giving precise guidelines that state that 90% of confidence intervals should exist between the ratio of generic medicine to brand medicine for important pharmacokinetic parameters.⁷

Although such measures improve generic medicine usage, there is a hesitancy among health care providers in India to utilize generic medicine.^{8,9} The pharmacist in India is not confident about the promotion of generic medicine. This low confidence in the advancement of generic medicine may be due to limited exposure to the topic in their curriculum. So, it is essential to identify the difficulty most students face regarding generic medicine and solve the problem, ultimately improving the utilization of generic medicine. This study aims to understand pharmacy students' perception and knowledge on the differences between branded drugs and generic drugs and on the safety, efficacy, and other details regarding generic medicines.

MATERIALS AND METHODS

The web-based cross-sectional survey was conducted among pharmacy students from September 2020 to February 2021, in which data collection time was from September 2020 to November 2020. For this research, pharmacy students of south India, especially Bangalore, were chosen on social media. The study has been reported according to the Strengthening

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