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RESEARCH PAPERS PUBLISHED BY THE FACULTIES

ASSESSMENT YEAR:2020-21

S.No.	Main author and others	Title of the research article	Journal and ISSN no.	Volume and Page no.	Year
1.	Nazemoon Reddy, **Swarnalatha Dugasani**, DevannaNayakanti	Solubility Promotion of Telmisartan by solid dispersions using Polymer combinations	Research Journal of Pharmacy and Technology& ISSN: 0974-3618	14(1), 280-284.	2021
2.	Nazemoon Reddy, **Swarnalatha Dugasani**, DevannaNayakanti	Fabrication and assessment of telmisartan sold dispersion for Solubility enhancement by the influence of variable Polymers	Journal of Global Trends in Pharmaceutical Sciences& ISSN–2230-7346	12 (2), 9598 -9607	2021
3.	Nazemoon Reddy, **Swarnalatha Dugasani**, Devanna Nayakanti	Fabrication and Characterization of Lercanidipine Hydrochloride Solid Dispersions by Fusion Technique	International Journal of Life Science and Pharma Research& ISSN 2250-0480 (Online)	11(1), 78-86	2021
4.	Nazemoon Reddy, **Swarnalatha Dugasani**, DevannaNayakanti	Preparation of lercanidipine solid dispersions by various polymers, in vitro and in vivo comparative pharmacokinetics study in rabbits	Journal of Global Trends in Pharmaceutical Sciences& ISSN–2230-7346	12 (3), 9607 - 9617	2021
5.	**P. Anitha** and S. V. Satyanarayana	Design and optimization of nanoinvasomal gel of Glibenclamide and Atenolol combination: in vitro and in vivo evaluation	Future Journal of Pharmaceutical Sciences & ISSN: 2314-7253	7(1), 1-18	2021

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6.	**P. Anitha,** S. V. Satyanarayana	Proniosomal gel mediated transdermal delivery of glibenclamide and atenolol combination: ex-vivo and pharmacodynamic studies	International Journal of applied pharmaceutics& ISSN: 0975-7058	13(1) 242-248	2021
7.	**P. Anitha** , S. Ramkanth , S.V. Satyanarayana	QBD based Design and Characterization of Proniosomal Transdermal Delivery of Atenolol and Glibenclamide Combination: An Innovative Approach	Bulletin of faculty of pharmacy& ISSN: 2090-9101	58 (2), 107-115	2021
8.	MalleshKurakula, **N. Raghavendra Naveen**	Electrospraying: A facile technology unfolding the chitosan based drug delivery and biomedical applications	European Polymer Journal& ISSN: 1873-1945	147, 110326	2021
9.	MedaVenkatasubbaiah, **Dwarakanadha Reddy P**, Suggala V Satyanarayana	Knowledge, attitude, and practices (KAP) of the Pharm. D interns towards adverse drug reaction (ADR) reporting and pharmacovigilance	Pharmacy Education& ISSN: 1477-2701	21, 186-193	2021
10.	Adapa Satish Kumar, **P. Dwarakanadha Reddy**, S. V. Satyanarayana	In vitro Evaluation of Selected Fruit Extracts against Cardiovascular Diseases	Asian Journal of Pharmaceutics & ISSN: 1998-409X	15 (1), 94-99	2021
11.	Neelima Satrasala, **Dwarakanadha Reddy Peram**, Chandra Sekhar Kothapalli Bannoth	Nephroprotectivity of Cocciniaindica leaves against gentamycin induced nephrotoxicity using in vitro and in vivo models	Journal of Applied Pharmaceutical Science & ISSN: 2231-3354	11(06), 132-139	2021
12.	MedaVenkatasubbaiah,	Questionnaire-based study on the	Asian Journal of	14 (1),	2021

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	Dwarakanadha Reddy P, Suggala V Satyanarayana	assessment of doctor of pharmacy interns' knowledge, attitude, and practices regarding the pharmacovigilance	Pharmaceutical and Clinical Research & ISSN: 2455-3891	158-162	
13.	NeelimaSatrasala, **Dwarakanadha Reddy Peram**, Chandra Sekhar KothapalliBannoth	Nephroprotective Activity of Annona Squamosa Extract on Amphotericin B-Induced nephrotoxicity through InVitro and In-Vivo Models	International journal of pharmaceutical research & 0975-2366	13(2), 7-13	2021
14.	R. V. Anil Kumar, **P. Dwarakanadha Reddy**	Evaluation of the Effectiveness of the Use of Pantoprazole and the Risks	Journal of Advances in Medicine and Medical Research & ISSN: 2456-8899	13(15), 35-41	2021
15.	P. Yogi Eshwar Kumar , B. GnanaSruthi, P. Sivani, S. Vedavyas Reddy and **D. Giri Rajasekhar**	Impact of clinical pharmacist mediated patient counseling in dyslipidemia patients by using lipid lowering agent	International Journal of Pharmaceutical Sciences and Research & ISSN: 2320-5148	12 (5), 2779-2782	2021
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17.	E. Pavan Kumar, V. Sreedhar, P. Ramakrishna Reddy, L. Reddenna,**M. Pramod Kumar**, B. Jayanthi, N. Sirishal and K. Salma	Prescribing Pattern in Geriatrics with Cardio Vascular Diseases using Beers Criteria	Journal of Pharmaceutical Research International & ISSN: 2456-9119	33(5), 6-11	2021

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18.	V. Sreedhar, L. Reddenna, T. Rajavardhana, J. ThippeRudra, E. Pavan Kumar, **M. Pramod Kumar**, M. Kalyan Sail, T. Sivasaileela,Y. Yamini1, B. Sreelekha1, B. Nishkala1 and M. Mahesh	Clinical Efficacy and Safety Profile of Lurasidone Comparing with Risperidone: Randomized, Open Label, Clinical Study	Journal of Pharmaceutical Research International &ISSN: 2456-9119	33(4), 20-27	2021
19.	Naga Subrahmanyam S, TagooreVijaya Lakshmi, **Pradeep Kumar Reddy**	Case Report on Drug Induced Erythroderma	Inventi Rapid: Pharmacy Practice& E-ISSN: 0976-7525 ; P-ISSN: 2229-4201	(4),1-3	2020
20.	Yogi Eshwar Kumar P , Pradeep Kumar C, Siva Prasanna K, **Sudhakar S**	A prospective study on assessment of risk factors and management of lower respiratory tract infections in paediatrics	International research journal of pharmacy& ISSN: 2581-3277.	11(10), 4-9	2020
21.	Sireesha M, Gnaneswari RV, Reddy santhosh, Mahesh PA,Lakshminarasimha G, Madhavi K	Impact of promoting healthy lifestyle interventions among adolescents, young adults with polycystic ovarian disease in resource limited settings	International Journal of Research in Pharmaceutical Sciences &ISSN: 0975-7538	11, 2950-2954	2020
22.	R. V. Anil Kumar, **P. Dwarakanadha Reddy, M. Pramod Kumar**	A Review on Current Therapeutic Options for COVID-19	International Journal of Pharmaceutical Sciences Review and Research & eISSN: 0976-044X.	65(2), 160-164	2020
23.	Yogi Eshwar P. Kumar, **Giri D. Rajasekhar**	A study of prescription auditing in inpatient general medicine in tertiary	International Journal of Research in Medical	08 (11), 3979-82	2020

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		care government hospital	Sciences & ISSN 2320-6012		
24.	MedaVenkatasubbaiah, **Dwarakanadha Reddy P**, Suggala V Satyanarayana	Analysis of the Adverse Drug Reactions and Associated Cost Burden on the Patients in a South Indian Teaching Hospital	Journal of Advances in Medicine and Medical Research & ISSN: 2456-8899	32(21), 88-98	2020
25.	NeelimaSatrasala, **Dwarakanadha Reddy Peram**, Chandra Sekhar Kothapalli Bannoth	Nephroprotective activity of Annona Squamosa leaves against paracetamol induced nephrotoxicity in rats: in vitro and in vivo experiments	Future Journal of Pharmaceutical Sciences & ISSN 2314-7253	6 (131), 2-8	2020
26.	Mallesh Kurakula, N. Raghavendra Naveen	Prospection of recent chitosan biomedical trends : Evidence from patent analysis (2009-2020)	International journal of Biological macromolecules &ISSN: 0141-8130.	165, 1924-1938	2020
27.	GuduruRajeswari, **D. Swarna-Latha**, K. B. Chandra Sekhar	Preliminary phytochemical screening, RP-HPLC, HPTLC and anti-oxidant studies of Pinusmaritimus	International Journal of Green Pharmacy& e-ISSN: 1998-4103	14 (3), 293-297	2020
28.	GuduruRajeswari, **D Swarna-Latha**, K B Chandra Sekhar	A novel immunomodulatory activity of sidaglutinosa-A magical Indian tradition medicine	Journal of Global Trends in Pharmaceutical Sciences & ISSN–2230-7346	11 (4), 8791-8800	2020
29.	**M. Hima Bindu**, Buduru Gowthami	Utilization of Lipids, Polymers by Modern Techniques for Innovative Pharmaceutical Formulations and Medical Devices	International Journal of Research in Pharmaceutical sciences and Technology&	2(1), 07-11	2020

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30.	Anil Marasani , **Swarnalatha Dugasani,** Eswar Kumar Kilari.	Phytochemical, antioxidant, anti-stress and cerebroprotective activity of ethanolic extract of stem of *Sarcostemma acidum*	Research Journal of Pharmacy and Technology & ISSN 0974-360X (Online)	14(11): 1612-1620	2021

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RJPT

RESEARCH ARTICLE

Solubility Promotion of Telmisartan by solid dispersions using Polymer combinations

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ABSTRACT:

This research aimed to prepare Telmisartan solid dispersions with polymer blend [Equal portion of PVP K-30, Poloxamer-188, and (HPMC) K4M. Various ratios of Telmisartan: Polymer blend in the ratios (1:1, 1:3, 1:5 and 1:7) were fabricated as solid dispersions by melting and solvent evaporation methods, later compressed into tablets. The solid dispersions were tested for physicochemical, and release constraints. The results discovered that the formulations were impressed with the increase in the solubility. Among them formulation with a 1: 5 ratio found to be the best proportion for enhancing the solubility and release rate of Telmisartan from the solid dispersions.

KEYWORDS: Telmisartan, polymer blend, solid dispersions, solubility.

INTRODUCTION:

The oral route is preferred, as they are easy to handle and take by patients of all age groups. Telmisartan (TSN) is an antihypertensive drug[1] belongs to BCS-class II drug and low solubility results in low bioavailability (~45%)[2]. Among the various techniques of solubility enhancing, solid dispersion (SD) technique[3] stands on the top priority as it is a simple, easy and efficient approach.

Water-soluble polymers viz., Poly Vinyl Pyrrolidone (PVP) K-30[4], Poloxamer-188[5] and Hydroxy Propyl Methyl Cellulose (HPMC) K4M[6] were employed with a promising role in increasing the solubility of drugs. In the present examination, the SD were prepared by melting and solvent evaporation techniques.

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MATERIALS AND METHODS:

Materials:

Telmisartan was gifted by Cipla Ltd, Bengaluru. PVP K30, Poloxamer-188, HPMC K4M, Microcrystalline Cellulose, Talc, and Magnesium stearate were procured from SD Fine chemicals India. Double distilled water was used whenever appropriate.

Methods:

Designing of Solid Dispersions

The various formulae of TSN solid were shown in table 1.

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FABRICATION AND ASSESSMENT OF TELMISARTAN SOLD DISPERSION FOR SOLUBILITY ENCHANCEMENT BY THE INFLUENCE OF VARIABLE POLYMERS

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Key words:
Telmisartan, Poloxamer-188, Solid Dispersion, Solubility, Dissolution.

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ABSTRACT

The authors aimed to design solid dispersion with Telmisartan (TSN) with PVP K-30, Poloxamer-188, and HPMC K4M as carriers. Various mixtures of TSN and polymers (PVP K-30 Polaxamer-188 and HPMC K4M) were made in 1:1,1:3, 1:5 and 1:7 ratios, and the solid dispersion was prepared by solvent evaporation method tactic, later compressed into tablets. Drug excipients compatability studies for examined by DSC and FTIR studies. TSN was found to compatable with carriers used. The TSN solid dispersion was measured for physicochemical quality both in solid dispersion SD, and tablet states. The TSN solid dispersion found to have excellent flow possession and compression assets. The yield of prepared solid dispersion was absorbed to be more than 90% and the formulation TPOX-7 has showed a good yield of 95.8 ±2.36 %, the tablets which were compressed for solid dispersion were found to have a uniform in size, shape, color, and consistency. The tablets were observed to have a uniform thickness, and weight and ranged 300.2± 1.36 to 303.0 ± 1.28 mg the loss on friability was less than 1% and the hardness was more than 4kg/cm² indicates significant mechanical strength and the TSN content was also found to be uniform (96.8± 1.35 to 99.9± 2.34). The solubility of TSN was found to be good in 0.1N HCL and diminished with an increase in PH of buffer. TSN released from the tablet were firstly by eruption followed by zero-order. The dissolution was found to be good in solid dispersion with TSN: Poloxamer-188 at the ratio of 1:5.The results obtained satisfactory. The study concludes that TSN solid dispersion (TPOX-7) with 1:5 ratios of TSN and Polaxamer-188 was found to be a better carrier than PVP K-30 and HPMC K4M in increasing the solubility of TSN from the solid dispersions.

INTRODUCTION

Hypertension is well endorsed as major risk factor for cardio vascular diseases even though there are evidence to assist the beneficial effects of antihypertensive therapy on mobility and mortality. A appropriate B.P management still remains suboptimal [1]. Temisartan (TSN) is prescribed for its calcium channels blocking activity and prescribed for hypertension. It is a BCS class-2 drug with t ½ of 8H and bioavailability of 10% [2]. TSN have no issue with membranes permeation but actual problem with its low aqueous solubility [3]. The researches do various trails to elevating the solubility of such drugs. Several methodologies adopted to solubilize the drug

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International Journal of Lifescience and Pharma Research

Research Article

Pharmaceutics for effective drug dosage

Fabrication and Characterization of Lercanidipine Hydrochloride Solid Dispersions by Fusion Technique

Nazemoon Reddy[1*], Swarnalatha Dugasani[2] and Devanna Nayakanti[3]

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Abstract: The authors aimed to design solid dispersions with Lercanidipine Hydrochloride (LCD) with PVP K-30, Poloxamer-188, and HPMC K4M as carriers. Various mixtures of LCD and Polymers (PVP K-30, Poloxamer-188, and HPMC K4M) were made in 1:1, 1:3, 1:5 and 1:7 ratios, and the solid dispersion was prepared by melting tactic, later compressed into tablets. Drug excipient compatibility studies were examined by DSC and FTIR studies. LCD was found to compatible with carriers used. The LCD solid dispersion was measured for physicochemical quality both in solid dispersions SD, and tablet states. The LCD solid dispersions found to have excellent flow possessions and compression assets. The yield of prepared solid dispersion was observed to be more than 90%), and the formulation LPOX-3 has showed a good yield of 98.9±1.95%, The tablets which were compressed from solid dispersions were found to have a uniform in size, shape, color, and consistency. The tablets were observed to have a uniform in thickness, and weight and ranged from 300.2±1.64 to 301.7±1.64 mg. The loss on friability was less than 1%, and the hardness was more than 4 Kg/cm^2 indicates significant mechanical strength and the LCD content was also found to be uniform (96.8±1.35 to 99.9±2.34). The solubility of LCD was found to be good in 0.1N HCl and diminished with an increase in pH of the buffer. LCD released from the tablets were firstly by eruption followed by zero order. The dissolution was found to be good in solid dispersions with LCD: Poloxamer-188 at the ratio of 1:5. The results obtained were satisfactory. The study concludes that LCD solid dispersions (LPOX-3) with 1:5 ratios of LCD and Poloxamer-188 was found to be a better carrier than PVP K-30, and HPMC K4M in increasing the solubility of LCD from the solid dispersions.

Keywords: Lercanidipine, Poloxamer-188, solid dispersions, solubility, dissolution.

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PREPARATION OF LERCANIDIPINE SOLID DISPERSIONS BY VARIOUS POLYMERS, *IN VITRO* AND *IN VIVO* COMPARATIVE PHARMACOKINETICS STUDY IN RABBITS

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ARTICLE INFO

Key words:
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ABSTRACT

This research aimed to prepare Lercanidipine solid dispersions with polymer blend equal portion of poly vinyl pyrrolidine (PVP) K-30, poloxamer-188, and hydroxy propyl methyl cellulose (HPMC) K4M. Various ratios of Lercanidipine Polymer blend in the ratios (1:3 and 1:7) were fabricated as solid dispersions by melting and solvent evaporation methods, later compressed into tablets. The solid dispersions were tested for physicochemical, and release constraints impressed with the increase in the solubility. Among them formulation with a 1:7 ratio found to be the best proportion for enhancing the solubility and release rate of Lercanidipine from the solid dispersions. LSD-4 was selected for the In vivo study Cmax was increased by 3.37 times, T max values of the formulations LSD-4 was equivalent, the AUC (0-8h) was ~4 folds more and the AUC (0-∞) was marginal increase i.e., 4.12 folds more than LCD pure drug. These fallouts suggest that the absorption rate and bioavailability of SD formulation is more when compare to pure

INTRODUCTION

The oral route is preferred, as they are easy to handle and take by patients of all age groups. Lercanidipine (LCD) is an antihypertensive drug (Talluri MK, et al 2012) belongs to BCS-class II drug and low solubility results in low bioavailability (~45%) (Yang L, et al 2014) Among the various techniques of solubility enhancing, solid dispersion (SD) technique (LeunerC, et al 2000). stands on the top priority as it is a simple, easy and efficient approach.

Water-soluble polymers viz., Poly Vinyl Pyrrolidone (PVP) K-30 (BhiseS, et al., 2011) Poloxamer-188 and Hydroxy Propyl Methyl Cellulose (HPMC) K4M (Zhong L, et al 2013) were employed with a promising role in increasing the solubility of drugs. In the present examination, the SD were prepared by melting and solvent evaporation techniques. The pharmacokinetic parameters of the prepared systems were

Future Journal of Pharmaceutical Sciences

RESEARCH

Open Access

Design and optimization of nano invasomal gel of Glibenclamide and Atenolol combination: in vitro and in vivo evaluation

P. Anitha[1*] and S. V. Satyanarayana[2]

Abstract

Background: There are many circumstances where chronic disease is associated with other disorders, especially in diseases such as diabetes with noncommunicable disease risk factors, such as hypertension. The current therapies for treating such chronic comorbid diseases are limited and challenging due to the difficulties in overcoming the side effects from complex therapeutic treatment regimen. The present study is aimed to develop and optimize the combinational nano invasomal gel of Glibenclamide (GLB) and Atenolol (ATN) as a novel combination therapy for comorbid treatment of diabetic hypertensive patients. The developed formulations were characterized for various parameters, including in-vitro skin permeation, skin irritation, in-vivo antidiabetic, and antihypertensive activities.

Results: OCNIG showed that the % entrapment efficiency of GLB is 96.67 ± 0.65% and % entrapment efficiency of ATN is 93.76 ± 0.89%, flux of GLB (240.43 ± 1.76 μg/cm^2/h), and flux of ATN (475.2 ± 1.54 μg/cm^2/h) which was found to conform to the expected value. The results indicated desired release and permeation profiles. Optimized formulation showed significant pharmacokinetic properties, which shows improvement in bioavailability by 134.30% and 180.32% respectively for two drugs, when compared to marketed oral preparation. Pharmacodynamic studies showed improved and prolonged management of diabetes and hypertension in Wistar rats, compared to oral and drug-loaded nano invasomes formulations.

Conclusion: Overall, the results showed that nano invasomal gel was found to be a useful and promising transdermal delivery system for the treatment of concurrent diseases.

Keywords: Transdermal delivery, Nano invasomal gel, Atenolol, Glibenclamide, Combination

Background

Diabetes is a rapidly growing global health issue, partly because of improved living conditions and rising rates of obesity [1]. The incidence of hypertension in the diabetic population is 1.5 to 3 times higher than in the non-diabetic age group [2]. The management and prevention of chronic disease require particular attention to self-management, including the use of a number of medications prescribed for comorbidity [3]. Former surveys have reported that it is related to poor results, including mortality, hospitalization, and health maintenance costs in chronically ill patients [4, 5]. Thus, simultaneous research aims to solve these problems by developing new combinations of fixed doses in two different categories and by applying new routes of administration.

Transdermal administration provides benefits such as avoidance of first-pass effect, control of drug release rate, improved patient compliance, alternative to the immediate end of therapy, etc. [6]. This is most suitable for combination/concomitant diseases that are administered at different timings (before and after food) via the oral route. In recent years, different types of nanocarriers have been designed to improve transdermal drug administration [7].

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Original Article

PRONIOSOMAL GEL MEDIATED TRANSDERMAL DELIVERY OF GLIBENCLAMIDE AND ATENOLOL COMBINATION: *EXVIVO* AND PHARMACODYNAMIC STUDIES

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ABSTRACT

Objective: The objective of the present work was to develop an optimized dosage form for treating comorbidity in combination and evaluate it for its pharmacodynamic performance in male Wistar albino rats.

Methods: Transdermal proniosomal gel for Combination of Glibenclamide (GLB) and Atenolol (ATN) was developed and optimized by Box Behnken design. This optimized combinational proniosomal gel (OCPG), which was selected by a point prediction method, was evaluated for its *ex vivo*, skin irritation studies and pharmacodynamic activities of both drugs in rats in comparison with its oral therapy.

Results: The *ex-vivo* permeation behavior through different skins was studied and the findings were also confirmed by the values of the steady-state flux (J_{ss}). The OCPG observed an increase of more than twice in the cumulative amount of impregnated drugs compared to pure drug films. The study on skin irritation revealed the non-irritability of the developed OCPG applied. OCPG significantly showed sustained hypoglycemic activity in rats ($p<0.001$), when compared to orally treat animals up to 24 h. Systolic blood pressure (SBP) lowering effect of OCPG was found to be significant ($p<0.02$), when compared to orally treat rats up to 24 h. However, the reduction was slow and sustained in the case of OPCG where a significant response was observed in the performed studies.

Conclusion: Overall, the results show that controlled release GLB and ATN proniosomes offer a useful and promising transdermal delivery system. Henceforth this may be an achievement in treating the diabetic hypertensive patient.

Keywords: Combination therapy, Atenolol, Glibenclamide, Proniosomes, Pharmacodynamic study

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INTRODUCTION

Diabetes mellitus (DM) is a complex chronic disease that requires ongoing medical care and multi-factor strategies to reduce risk beyond glycemic control [1-3]. In DM, a constant increase in glucose levels can lead to chronic micro-and macro-vascular effects [4-7]. A patient with multiple comorbid conditions requires multiple medications to treat each condition, increasing side effects and treatment costs. Combined pharmacotherapies may provide additive benefits that target multiple disease processes [8]. Fixed-dose combination drugs (FDC's) were originally developed to target only one disease. However, CFDCs can also target more than one disease/condition [9, 10]. However, no CDF has been developed for diabetes and its co-morbidities, like hypertension.

Transdermal drug delivery systems offer a promising alternative to oral administration, particularly in preventing difficulties associated with this combination [11, 12]. This is particularly relevant for these products as these two classes of medications are administered at two different times (before and after the diet) when administered by the oral route [13]. Oral administration of GLB causes symptoms like headache or nausea, cold sweats, excessive hunger [14-16]. Atenolol (ATN) is widely used in the management of hypertension as monotherapy or in combination with other classes of antihypertensive agents [17]. The absorption of Atenolol upon oral administration in humans and most laboratory animal species is rapid but incomplete [18]. Thus the transdermal administration of GLB and ATN would have a better dosage form being that it increases bio-availability.

Therefore, the combination of GLB and ATN through transdermal delivery can be a better therapeutic combination for effective control of diabetes and its coexisting cardiovascular complications (hypertension). The primary objective of this research was to assess the *ex vivo* and pharmacodynamic behavior of the optimized formulation of GLB and ATN obtained by designing Box Behnken as a proniosomal gel for transdermal administration.

MATERIALS AND METHODS

ATN and GLB were received as gift samples from Sun Pharma Ltd., Mumbai, India. Span 60 and cholesterol were purchased from SD Fine Chemicals, Mumbai, India. Phospholipid (Brand: Phospholipon 90G) was a gift sample supplied by Phospholipid GmbH, Nattermannallee, Koln Germany. The other reagents and chemicals used were of analytical grade and were procured from Merck Limited, Mumbai, India.

Preparation and optimization of proniosomes

Coacervation-phase separation method was followed for the preparation of proniosomes, which was reported by Perrett and Vora [19, 20]. To assess the interaction impacts of surfactant, Phospholipid, and Cholesterol in the formulations; 3-factor, 3-level Box Behnken design was utilized. An absolute 17 test runs were produced by design expert Version 11 software [21]. The independent variables were surfactant (Span 60) (X1), Cholesterol (X2) and phospholipid (Phospholipon 90G) (X3) while Vesicle size (VZ) (Y1) entrapment efficiency of GLB and ATN (Y2 and Y3 respectively) were the dependent variables which are given in table 1.

Ex vivo permeation study by using different skins

Preparation of rabbit skin

The preparation of skin was as per Xi *et al.* [22]. Male, white Newzeland Rabbits weighing 2.0-2.5 kg was obtained from the National center for laboratory animal sciences (NCLAS) after approval from the Institutional Animal Ethics Committee (IAEC No.: IAEC/ANCP/2018-19/02). All the animals used in the study were caged and maintained according to the guidelines of CPCSEA or principles established for the care and use of laboratory animals. After the rabbit was anesthetized with urethane (20 %, w/v), the skin was made hairless by applying hair removal cream (Veet® depilatory cream). The side of stratum corneum was extracted after the rabbit was sacrificed and the sub-dermal tissue was carefully removed. The side of the stratum corneum was cleaned with distilled water. The skin was washed with phosphate buffer saline (PBS), wrapped in aluminum foil and stored in a deep freezer at-20 °C till further use (used within 2 d of preparation) [23-25].

2020-21

ORIGINAL ARTICLE - PHARMACEUTICAL TECHNOLOGY

QBD based Design and Characterization of Proniosomal Transdermal Delivery of Atenolol and Glibenclamide Combination: An Innovative Approach

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Abstract

There are numerous circumstances where chronic disease is associated with other disorders, especially in diseases like diabetes with noncommunicable disease risk factors, such as hypertension. This study shows a novel and innovative combinational proniosomal delivery of combination to beat the reactions by complex therapeutic regimen, and to improve patient compliance after controlling combinational transdermal delivery of Glibenclamide (GLB) and Atenolol (ATN) which have not been tried actually. To achieve the above reason, proniosomes were prepared and optimized utilizing Box-Behnken design. The ideal formulation was chosen by a point prediction method and formulation showed vesicle size of 562 ± 1.223 nm, entrapment efficiency of GLB & ATN 97.037 ± 1.43% and 96.230 ± 1.62% respectively which were found in concurrence with the predicted value. The optimized combinational proniosomal gel (OCPG) formulation was additionally assessed for *in vitro* drug release, *In vitro* drug permeation, and *in vivo* pharmacokinetic study. The OCPG formulation shows the greatest flux over the rabbit skin (128.609 ± 2.24 μg/cm^2/h and 322.054 ± 1.53 μg/cm^2/h) of GLB and ATN respectively. The results indicated desired release and permeation profiles. OCPG showed significantly ($p < 0.001$) pharmacokinetic contemplate exhibited that transdermal proniosomal formulation demonstrated improvement in bioavailability of two drugs 129.30 and 174.62 times respectively as that of the oral formulation. Overall the results show that controlled release GLB and ATN provesicles offer a useful and promising transdermal delivery system for the treatment of type II diabetes and hypertension by using design. Henceforth this may be an achievement in treating diabetic hypertensive patient.

Keywords: Atenolol, Glibenclamide, Transdermal delivery, Proniosomes, Combination

1. Introduction

Medication administration remains the hallmark of drug therapy. A general aspiration of pharmacotherapy is to ensure a therapeutic drug concentration in specific areas of the body [1]. The Oral administration remains the most normally used routes for medicine. An oral medication generally becomes active when it passes from the gastrointestinal tract and the liver into the blood, which reduces the bioavailability and other side effects. But for this combination medication, it may not be suitable because of the fact that the time of administration of the two medications is different, which assumes a vital role in ingestion of medications in GIT [2]. These side effects were overcome by one of the alternative routes transdermal drug delivery system

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Q6

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Electrospraying: A facile technology unfolding the chitosan based drug delivery and biomedical applications

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ABSTRACT

Chitosan (CS) a promising biopolymer has been explored for wide biomedical applications using different technologies. Electrospraying is one of the advancing liquid atomization-based techniquesrapidly merging in fields of biomedicine, especially in drug delivery and biomedical applications. Recent studies revealed that wide therapeutics such as antibiotics, anticancer, bioactives (enzymes, growth factors, genes, cells) were successfully loaded and delivered by CS using electrospraying. Apart from the exploration of CS bioactivity in drug delivery, we attempt to brief about the electrospraying technology, parameters regulating final product quality, types of polymers used, advantages, and limitations. The scrutiny highlights different conventional to controlled delivery systems fabricated by electrosprayed CS alone or in combination with other co-polymers. Further, the comprehensive addresses the different biomedical applications like wound healing, tissue engineering, coatings for antimicrobial, bone regeneration, as dental coatings, or surface modifications based on electrosprayed CS. In comparison to other methods, CS-based coating by electrospraying technique has helped to achieve desired properties for specific functions moving many processes to product commercialization. Exploration of patents filed and published from the past decade (2009–2020) based on the electrosprayed CS in the drug delivery are listed and the trends are reported. The review is concluded with an insightful outlook and future perspective of electrosprayed CS products for their broad applications, high coherence, and safe fabrication.

1. Introduction

Electrodynamic sparing, simply electrospraying is an efficient technique in producing miniature droplets with submicron size, by applying an electric field to the metal nozzle. The droplets formed then take wing towards the collector, that is connected to counter electrodes or earth. The application of electrospray technology has been extended to various fields of research, especially to formulate micro/nanoparticular cargo carriers for various biomedical applications, including drug delivery, biomedical imaging, implant coatings, and tissue engineering. Electrospray technique can also be applied to prepare fine polymeric nanoparticles by encapsulation and other carrier-mediated systems. In contrast to other conventional methods, electrospraying has several advantages and very few limitations [1]. For example, the entire spraying procedure can be performed at ambient temperature and pressure conditions, making a great benefit for the fabrication of carriers for the delivery of sensitive bio-molecules/actives or living cells. Additionally, the probable absence of an external medium or solvent, that may cause migration or dissolution of the hydrophilic carriermay greatly benefit in achieving specific use. Absence of coalescence in the case of electrosprayed droplets, due to the electrostatic charge repulsion, will results in uniform spread across large surface areas [2]. Electrospraying technology has evolved as an attractive technique in producing several carriers, nanofibers of desired characteristics. This exponentially helped the electrospraying process to be utilized for multidisciplinary applicationsparticularly in pharmaceutical and biomedical industries. With the slight alteration of processing parameters and solution factors, the electrospraying process can greatly help in preparing various types of carriers like hollow microspheres [3,4] nanocups [5], porous microcarriers [6–8] cell-shaped microparticles [9,10], core-shell/multilayered microspheres and janus particles [11–14].

Electrosprayinghas been reported as a successful method since a variety of polymers, can be translated for wideapplications. Commonly utilized natural (carbohydrate and protein source) and synthetic

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RESEARCH ARTICLE

Knowledge, attitude, and practices (KAP) of the Pharm.D interns towards adverse drug reaction (ADR) reporting and pharmacovigilance

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Keywords
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Abstract

Introduction: Lack of awareness about pharmacovigilance (PV) is one of the most important causes of under-reporting, which is widespread and poses a daunting challenge in India. The aim of this study is to assess and to document the knowledge, attitude, and practices (KAP) of Doctor of Pharmacy (Pharm.D) interns who practicing in hospitals with regards to PV and adverse drug reaction (ADR) reporting and to identify the causes of under reporting. **Methods:** This cross-sectional descriptive study was conducted for a period of six months across ten hospitals in Andhra Pradesh, India. **Results:** Overall, 578 responses were analysed, 78% of the participants had good knowledge on reporting ADR, 82% were aware that patient will be benefited from the ADR reporting, and the majority of the participants had a positive attitude towards reporting ADR. Fifty-nine percentage of the participants had reported the ADRs through different ADR reporting procedures, 52% were advised the awareness programmes for improving the reporting culture, and 34% had the difficulty in deciding or diagnosing the ADR. **Conclusion:** The KAP of the Pharm.D interns is appreciable and may reduce the burden on the other healthcare providers and improve patient care.

Introduction

Adverse drug reactions (ADRs) are one of the major problems associated with medicines. ADRs are responsible for a significant number of hospital admissions (Kaur *et al.*, 2015). The World Health Organization (WHO) defines an ADR as "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 the modification of physiological function" (Alsaleh *et al.*, 2017). While an adverse drug event (ADE) is an injury resulting from the use of a drug, it includes harm caused by the drug (ADR and overdoses) and harm from the use of the drug, including dose reductions and discontinuations of drug therapy (Chen *et al.*, 2015).

According to the American Society of Health-System Pharmacists (ASHP), ADRs may result in temporary or permanent harm, disability, or death or that may require discontinuing the drug, changing the drug therapy, modifying the dose, necessitates hospitalization, prolonged stay in a health care facility, necessitates supportive treatment, significantly complicates diagnosis, or negatively affects prognosis. ADRs are a global problem for both developing and developed countries with significant morbidity and mortality; these negative consequences are also reported with 'over the counter' drugs, but this is not

ORIGINAL ARTICLE

In vitro Evaluation of Selected Fruit Extracts against Cardiovascular Diseases

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Abstract

Objective: Cardiovascular diseases (CVDs) are the number one cause of death globally, more people die annually from CVDs than from any other cause. Much of this interest centers on the use of antioxidant vitamins and the antioxidant properties of herbal materials, although some herbal materials may also improve conventional cardiovascular risk factors or have antithrombotic effects. This study was undertaken to investigate the *in vitro* evaluation of selected fruit extracts against cardiovascular metabolic syndrome with methanolic extracts of *Schisandra (Magnolia vines), Muntingia calabura,* and *Alangium salviifolium* fruits. **Materials and Methods:** Angiotensin-converting enzyme (ACE) inhibition assay, assay of nitric oxide (NO) scavenging activity, and *in vitro* α-amylase inhibitory studies were carried out to evaluate the cardiovascular metabolic syndrome activity of methanolic extract of *Schisandra (M. vines), M. calabura,* and *A. salviifolium* fruits. **Results:** The preliminary phytochemical screening showed the presence of various phytoconstituents such as flavonoids, phenolic compounds, triterpenoids, tannins, saponins, amino acids, proteins, and carbohydrates in the fruit extracts. The ACE inhibitory activity of fruit extracts was represented as percentage ACE inhibition. The fruits extract demonstrated ACE inhibitory activity at a concentration of 800 µg/ml, showing an inhibition >50%. Statistically significant results were observed in *in vitro* α-amylase inhibitory assay and in NO scavenging assay. **Conclusion:** The role of redox mechanisms in the control of expression and activity of rennin-angiotensin system (RAS) enzymes and angiotensin receptors may provide important insight into the function of local tissue RAS in health and disease states. The selected fruit extracts have promising role against CVDs.

Key words: *Alangium salviifolium,* cardiovascular metabolic syndrome activity, *Magnolia vines, Muntingia calabura*

INTRODUCTION

The cardiovascular disease (CVD) is common, morbid, and responsible for about 17.3 million deaths annually worldwide.[1] The modifiable risk factors for CVD include obesity, hypertension, hyperlipidemia, type 2 diabetes mellitus, MetS, and lifestyle risk factors such as smoking, physical inactivity, and dietary factors.[1,2] The nutritional factors have an important bearing on the cardiovascular (CV) health, either directly or through their effects on various CV risk factors including hypertension, dyslipidemia, and diabetes mellitus. The protective effects against CVD have been demonstrated for various nutraceuticals and dietary supplements,[3] and these simple lifestyle interventions open practical, potentially easy, and affordable possibilities for population-based strategies for CVD risk reduction. Epidemiological and clinical data: Epidemiological and clinical studies indicate that the risk of CVD is reduced by a diet rich in fruits, vegetables, unrefined grains, fish, and low-fat dairy products, and foods low in saturated fats and sodium are helpful. Other foods such as mono- and polyunsaturated fats, brans, nuts, plant sterols, and soy proteins have all been shown to have a favorable effect on lipid profile and blood pressure, and the overall CV health. Foods and nutrients play a key role in functioning of various

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Nephroprotectivity of *Coccinia indica* leaves against gentamycin-induced nephrotoxicity using *in vitro* and *in vivo* models

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Key words:
Nephrotoxicity, gentamycin, *Coccinia indica*, antioxidants, HEK-293 cells.

ABSTRACT

The present study intends to explore the efficacy of ethanolic extract of *Coccinia indica* (EECI) leaves against nephrotoxicity induced by gentamycin (GT) via *in vitro* and *in vivo* experiments. Four groups with six Wistar rats each, with Group I receiving normal saline, Group II with GT (80 ml/kg), Groups III and IV with lower (200 mg/kg) and higher dose (400 mg/kg) of test drug, respectively, were deliberated for a 7-day experiment. Serum creatinine, urea, alanine transaminase, aspartate transaminase, and *alkaline phosphatase* were considered as biomarkers along with antioxidant enzymes to assess the nephroprotective nature of the extract and the results are supported by histograms. High-performance liquid chromatography analysis presented the phytochemicals present in the test drug. 3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide assay showed the competence of the test extract for the nephroprotective nature. The biomarker levels increased and the antioxidant levels decreased significantly with the administration of GT than the control group. However, with a treatment of 200 mg/kg of the test drug, there were notable required alterations for all considered parameters, and with a higher dose, the levels of biomarkers and catalase, superoxide dismutase, and reduced glutathione were almost near to control ones indicating the nephroprotective nature of considered plant extract. The EECI leaves posed an optimistic effect toward GT-induced nephrotoxicity.

INTRODUCTION

Owing to pretty enormous blood movements and a capacity to extract and aggregate the water-soluble toxic chemicals or molecules, the kidney is inclined to medication-persuaded nephrotoxicity (Perazella, 2003 & 2019). This kind of nephrotoxicity comprises several mechanisms consisting of vascular damage and glomerular as well as tubular damage (Randjelovic *et al*., 2017). However, the most commonly investigated one is necrosis caused at tubular epithelial cells and damage of glomerular morphology with lessened function (Stojiljkovic *et al*., 2012). Some of the drugs, such as gentamycin (GT) and cisplatin, are found to reduce the blood flow in the kidney of experimental animals and cause vascular resistance (Chatterjee *et al*., 2002).

The word "obligatory nephrotoxin" is given to one of the widely used antibiotics, GT, for bringing nephrotoxicity in human and rats even in small dosages (Adil *et al*., 2016; Veljkovic *et al*., 2017). It is an aminoglycoside drug which treats life-threatening infections caused by Gram +ve and Gram –ve bacteria (Al-Majed *et al*., 2002; Talei *et al*., 2017; Tavafi and Ahmadvand, 2011; Thomas *et al*., 2001). 10%–20% of all renal failure cases are accounted due to GT, thus confining its usage (Fashola *et al*., 2000). GT is known to produce reactive oxygen species (ROS) in the kidney causing necrosis in renal proximal tubular cells, in turn causing renal failure (Reiter *et al*., 2002) and is usually carried out by estimating the increased levels of creatinine in plasma and urea levels in the blood (Cuzzocrea *et al*., 2002; Reiter *et al*., 2002). Some of the compounds like melatonin (Kim *et al*., 2014; Lee *et al*., 2012), aminoguanidine (Balakumar *et al*., 2010; Polat *et al*., 2006), manganese chloride (Ateşşahin *et al*., 2003), and Arabic gum (Elshama, 2018) are known to avert GT-induced nephrotoxicity. Among them, one with antioxidant agents is known to consistently protect the experimental animals

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Research Article

QUESTIONNAIRE-BASED STUDY ON THE ASSESSMENT OF DOCTOR OF PHARMACY INTERNS' KNOWLEDGE, ATTITUDE, AND PRACTICES REGARDING THE PHARMACOVIGILANCE

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ABSTRACT

Objectives: The present study was contemplated and done to assess the knowledge, attitude, and practices (KAP) toward adverse drug reactions (ADR) reporting and Pharmacovigilance (PV) of the Doctor of Pharmacy Pharm.D interns for the first time in South India, to get an insight into their awareness and reporting culture.

Methods: A cross-sectional descriptive KAP questionnaire-based study was conducted for 6 months on Pharm.D interns.

Results: A total of 603 Pharm.D interns were participated, among them 578 (95.85%) were considered for the analysis. On an average of 78.25% of the participants had a good knowledge, around 82% were aware that patients' will be benefited from the ADR reporting. The majority of the participants had a positive attitude. Moreover, 59% had reported the ADRs through different ADR reporting procedures 52% were advised the awareness programs for improving the reporting culture, and 34% had the difficulty in deciding or diagnosing the ADR.

Conclusion: The KAP of the Pharm.D interns toward the ADR reporting and PV is appreciable and may reduce the burden on the other healthcare workers and improve patient care.

Keywords: Knowledge, Attitude, Practices, Pharmacovigilance.

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INTRODUCTION

Adverse drug reactions (ADRs) are one of the major problems associated with medicines. ADRs are responsible for a significant number of hospital admissions [1]. The World Health Organization (WHO) defines an ADR as "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 modification of physiological function" [2-4].

According to ASHP, ADRs results in temporary or permanent harm, disability, or death or that requires discontinuing the drug, changing the drug therapy, modifying the dose, necessitates admission to a hospital, prolongs stay in a health-care facility, necessitates supportive treatment, significantly complicates diagnosis, and negatively affects prognosis and became as global problem in both developing and developed countries with a significant number of morbidity and mortality [5,6]. Hence, the detection, recording, and reporting of ADRs becomes vital in the safe use of medicines. For this purpose, the concept of Pharmacovigilance (PV) was introduced to enhance the patients' safety and maximize therapeutic outcomes [7].

According to the WHO, PV is "the science and the activities which relate to the detection, assessment, understanding, and the prevention of adverse effects or any other drug-related problems" [8]. The National Programme of PV renamed as the PV Programme of India (PvPI) in 2010 and became a WHO Collaborating Centre for PV. However, several challenges are faced by the PvPI, and one of the challenges is creating continual awareness in the healthcare workers (HCPs) and general public about the ADR reporting [9,10].

India is participating in the program, its contribution to the Uppsala Monitoring Centre (UMC) database is 2% only; still, and further active participation is required to increase spontaneous reporting [11]. Lack of awareness about PV is one of the most important causes of such under-reporting, the reasons for which may be due to lack of trained staff and lack of awareness regarding detection, communication, and spontaneous monitoring of ADRs among the health-care professionals (physicians, nurses, pharmacist, and dentists). To improve participation of health-care professionals in spontaneous reporting, it might be necessary to design strategies that modify Knowledge, Attitude, and Practice (KAP) about PV and ADR reporting [7,12,13]. Studies conducted in the medical interns, nurses and hospital pharmacists suggested that the continual awareness programs on ADR reporting and PV might improve their practicing skills and paves the way toward the quality of care [12,14-17]. Review conducted by Saleh on the KAP of HCPs on ADR reporting and PV has revealed the necessity of awareness on PV in ADRs reporting [5].

Kalaiselvan *et al.* reported that the majority of ADRs were reported by physicians than pharmacists, as they are mainly confined to the drug distribution and do not have much scope in ADRs reporting [18]. Nowadays in the Indian health-care system, pharmacists are also involving in direct patient care through clinical pharmacy services [19]. Along with other health-care professional students (MBBS and Nursing) Doctor of Pharmacy (Pharm.D) students also would be trained in the hospital. In internship or residency training student is exposed to actual pharmacy practice or clinical pharmacy services includes drug therapy monitoring, medication history interview and patient counseling, Identifying and resolve drug-related problems especially ADR.

As of our knowledge in India, there are no/very few data available on the KAP of Pharm.D interns on ADR reporting and PV. Therefore, the present study was contemplated and done to assess the KAP of the Pharm.D interns in South India region regarding ADR reporting

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Research Article

Nephroprotective Activity of *Annona Squamosa* Extract on Amphotericin B-Induced Nephrotoxicity through *In-Vitro* and *In-Vivo* Models

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ABSTRACT

Amphotericin B (ATB) is one of the extensively used antifungal agent against many fungal infections. The excess intake of ATB exhibits the nephrotoxicity due to oxidative stress. *Annona squamosa* (AS), which showed many therapeutic strengths was chosen for the present study to investigate on its nephroprotective effect.Major objective of this study was to estimate the nephroprotective effect of ethanolic extract of *Annona squamosa* leaves (EAS) towards ATB-induced nephrotoxicity with an aid of *in vitro* Human Embryonic Kidney (HEK)-293 cells and *in vivo* on Wistar rats. *In vitro* cytoprotective effect was assessed by MTT assay using HEK-293 cells. Male Wistar rats (N=24) were alienated into four groups with six animals each. Group I given normal saline known as normal control. Group II was disease control, administered 15mg/kg of ATB, i.p. daily once for 5 days; Group III & IV animals were pre-treated with EAS of dose 200 & 400 mg/kg p.o. for ten days and from 6th day of experiment, animals began to receive ATB at 15mg/kg i.p., single dose for 5 days. HEK-293 cells incubated with ATB exhibited an increased cell death and were decreased on treatment with EAS. A quantitative estimation of ALT, AST and ALP, creatinine and blood urea nitrogen (BUN) were used to asses *in vivo* nephroprotective activity of EAS. The reduction ($P<0.001$) of serum biomarkers and elevation of glutathione (GSH), catalase (CAT) and superoxide dismutase (SOD) levels ($P<0.001$) in kidney tissue homogenate in treated groups when compared to the ATB treated alone was observed. Results were also supplemented by histopathological investigations. The work concludes potential of EAS against ATB-induced nephrotoxicity via *in vitro* and *in vivo* trials.

Keywords: Nephroprotective, Amphotericin B, *Annona squamosa*, MTT assay, Oxidative stress.

INTRODUCTION

Amphotericin B (ATB), a polyene antifungal agent which is widely used for candidiasis. It is known to exert its action by forming pores in the fungal cell wall which results in inward and outward movement of ions (Lemke A et.al.,2005; Bagmi CI & Deary G,2002; Tonomura Y et.al.,2009). Even after five decades of clinical use, ATB remains as the reference drug for various fungal infections. Due to its low cost, the drug has been used widely. As a result, there was high incidence of many adverse effects of ATB and commonest was nephrotoxicity (Laniado LR & Cabrales VMN, 2009). ATB induced nephrotoxicity by afferent arteriole vasoconstriction, which reduces a renal blood flow, declination of glomerular filtration rate and elevated urea and creatinine levels in serum (Girmenia et.al.,2001). Further, hypoxic and ischemic conditions result in elevation of reactive oxygen species (ROS) which include hydroxyl free radicals, peroxide and superoxide anions in epithelial tubule cells. ROSs are constantly produced as a product of cellular metabolism which act as scavengers for endogenous antioxidant enzymes such as glutathione peroxidise and superoxide dismutase. ATB induced nephrotoxicity elevates ROS generation by diminishing antioxidant power. This further leads to free radical predominance encouraging lipid peroxidation in cell membrane, oxidation of DNA and proteins, oxidative injury characterisation and cell injury (Rahal A et.al.,2014). To prevent adverse effects of ATB, it was formulated adopting novel methods. Despite of novel formulation methods, high doses and long term treatment with ATB could end up with nephrotoxicity and chief strategies depend on protective agents (Herbrecht R et.al.,2003). Medicinal plants usage for treating several ailments was performed for many millenniums. *Annona squamosa* (AS), commonly called as custard apple and sitaphal in English and Telugu

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Evaluation of the Effectiveness of the use of Pantoprazole and the Risks

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Authors' contributions

This work was carried out in collaboration between both two authors. Authors RV and PDR have contributed to the conception, design, data collection and analysis. The manuscript was written by author RV. Both authors read and approved the final manuscript

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Original Research Article

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ABSTRACT

Drug use evaluation (DUE) is a systematic approach to study the utilization of marketed drugs. These studies are proved invaluable for policy makers to get inputs on the use of drugs so that they can review their strategies. In this prospective observational study, we have conducted a DUE of Acid suppressant drugs in Outpatient department (OPD) of a tertiary care teaching hospital in Kadapa, Andhra Pradesh. In the armamentarium of acid suppressants Proton pump inhibitors (PPIs) occupied a special space owing to their superiority to others like H2 receptor blockers. PPIs are in the market for the last 40 years and their safety and efficacy is impeccable till now. These are the most commonly used drugs and tend to be used for long-term to manage acidity problems. But unregulated usage of PPIs over long term could pose very significant health problems ranging from electrolyte imbalance to cognitive impairment.

Our study identified some issues in prescribing PPIs suggesting there is generous use of PPIs without considering their risks. And their safety also taken for granted, it appears.

Keywords: Acid suppressants; proton pump inhibitors; pantoprazole; drug utilization evaluation.

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IMPACT OF CLINICAL PHARMACIST MEDIATED PATIENT COUNSELING IN DYS-LIPIDEMIA PATIENTS BY USING LIPID LOWERING AGENTS

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Keywords:

Dyslipidemia, Atorvastatin, Patient counseling, Lifestyle modifications, Clinical Pharmacist

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ABSTRACT: Aim: To estimate the impact of clinical pharmacist mediated patient counseling in dyslipidemia patients in RIMS hospital, Kadapa. **Objectives:** To conduct a randomized study on patients. To categorize patients on demographic basis, comorbidities. To compare the lipid levels based on 20 mg and 40 mg doses of atorvastatin, the outcome based on lipid profile. **Methodology:** It is a prospective observational, comparative type of study. Conducted in the department of general medicine, Rajiv Gandhi institute of medical sciences at Kadapa with a period of Six months (July 2018 to December 2018), and the sample size was 72 subjects. **Results:** A total of 72 patients were included in the study 86.11% were male, and 13.88% were female. Average age was found to be 57.11 years. Average BMI of males is 25.4 and females is 27.17 .36 patients included in group A (statin therapy) and 36 patients included in group B (statin + patient counseling). The P value of lipid levels in group A, and group B with two different doses of atorvastatin was found to be 0.7439. Baseline average lipids of both groups compared with fallow up final average lipid levels, and the P-value was found to be 0.2427. **Conclusion:** The findings in our study conclude that males are having a high risk of dyslipidemia, commonly obtained comorbidity is HTN, and there is no significant difference between the patients of group A and B.

INTRODUCTION: Dyslipidemia can be defined as elevated total cholesterol, LDL-C, or triglycerides level, low HDL-C concentration, or some combination of these abnormalities. Hyper-lipoproteinemia refers to an increased concentration of the lipoprotein macromolecules that transport lipids in the plasma.

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Abnormalities of plasma lipids can result in a predisposition to coronary, cerebrovascular, and peripheral vascular arterial disease [1, 2]. Based on etiology it is classified into two types; Primary dyslipidemia: Up to 60% of the cholesterol variability may be genetically determined and is often influenced by interaction with environmental factors.

And Secondary dyslipidemia: that occur secondary to a number of disorders, dietary discretion, or as a side effect of drug therapy accounts for up to 40% of all dyslipidemias [3]. Statins are the most effective agents for treating dyslipidemia. Statins exhibit an effect by reduction of LDL levels through a

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FORMUALTION AND EVALUATION OF ANALGESIC VANISHING CREAM

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ABSTRACT

The purpose of the present research work was to formulate and evaluate analgesic vanishing cream. Vanishing creams offer several advantages over other creams. They are called vanishing cream are because they seem to disappear when rubbed into the skin. These preparations are stearic acid based and part of the stearic acid is saponified with an alkali and rest of the stearic acid is emulsified with this soap in large quantity of water. These preparations are emulsion type and have an aqueous phase and oil phase, so ingredients of oil phase should be mixed gradually in increasing melting order, starting with melting of lowest melting point substances, components of aqueous phase should be mixed together and warmed to about same temperature of oil phase and mix with oil phase with continuous stirring until a smooth cream is formed, add perfume after cooling. The above prepared analgesic vanishing cream was then evaluated. The physical parameters such as pH, homogeneity by visual and by touch appearance (color), viscosity, dye test, moisture absorption studies, and *in vitro* studies were determined. In contrast with other creams or ointments, which are greasy and messy in nature and may cause staining of clothes, the prepared analgesic vanishing cream was pleasant, easily washable thereby increasing patient compliance.

INTRODUCTION

Skin cream is the age old necessity of mankind. This necessity leads to the continuous modification and invention of more and more skin care cosmetic preparations.

1. VANISHING CREAMS:

They are called vanishing cream are because they seem to disappear when rubbed into the skin. These preparations stearic acid based and part of the stearic acid is saponified with an alkali and rest of the stearic acid is emulsified with this soap in a large quantity of water. After application the cream leaves a dry but tacky residual film which also has a drying effect on the skin. Because of this reason the stearic acid soap based creams are still favoured for use with greasy skin condition and particularly in hot climates which cause perspiration on the face and where more emollient creams are not suitable.Finest quality triple-pressed stearic acid of melting point of about 55^0C is normally used. The high quality stearic acid provides an oil phase, which melts above body temperature and crystallizes in a suitable form, provides an invisible and non-greasy film and can produce a very attractive appearance. Normally 20-30% of free fatty acids is neutralized by using alkali [11].

1.1 Composition of analgesic vanishing cream:

The following are the ingredients used for preparation of analgesic vanishing cream active components as Methyl salicylate

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Prescribing Pattern in Geriatrics with Cardio Vascular Diseases using Beers Criteria

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Authors' contributions

This work was carried out in collaboration among all authors. Authors EPK and LR designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors VS, PRR, BJ, NS and KS managed the analyses of the study. Author MPK managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Cardiovascular disease (CVD) is a major health problem throughout the world and a common cause of premature morbidity and mortality. CVD is a general category of diseases that affects the heart and the circulatory system. The main aim of the study is to assess the prescribing pattern in geriatrics with cardiovascular diseases using beers criteria.
Study Design: Prospective observational study.
Results and Discussion: Total 132 patients, 12 dropouts due to lack of information. Out of 120 patients 69 Patients are identified as Male Patients and 51 Patients are Female. In 120 sample size Maximum No of Cases were found with Ischemic Heart disease (30.8%) Followed by myocardial infarction (24%) coronary artery disease (20%) congestive heart failure (13.3%) Unstable Angina (11.6%). In 120 Sample Size, Male Patients are Suffering More with Complications Compared to Female Patients.

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2020-21

Clinical Efficacy and Safety Profile of Lurasidone Comparing with Risperidone: Randomized, Open Label, Clinical Study

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Authors' contributions

This work was carried out in collaboration among all authors. Authors VS, LR and TR designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JTR, EPK, MPK, MKS, TS, YY and BS managed the analyses of the study. Authors BN and MM managed the literature searches. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

There are diverse studies which afford evidences that risperidone is as effective as second generation antipsychotics in treating positive symptoms and more effective in treatment of negative symptoms. This study is intended to find the clinical efficacy and safety profile of lurasidone comparing with risperidone, a drug in common use nowadays. Patients aged between 18 to 60yrs, Patients with new onset of symptoms who fulfil the ICD-10 criteria for a primary diagnosis of schizophrenia and Patients having a total PANSS score of ≥80 including a score ≥4 (moderate) on two or more of positive subscale at baseline. Patients with acute exacerbation of schizophrenia who remained drug free for at least last 6 months also included. Demographic data of the patients were collected. Baseline investigations like BP, complete blood count, lipid profile, blood sugar, renal function test and liver function test were done. Severity of schizophrenia at baseline was

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CASE REPORT

2020-21 inventi | Spreading Knowledge

Case Report on Drug Induced Erythroderma

Naga Subrahmanyam S[1*], Tagoore Vijaya Lakshmi[2], Pradeep Kumar Reddy[1]

Abstract: The epidemiology of drug-induced severe skin reactions accounts for 30% total of the world's population. The Drugs such as NSAIDs, antibiotics, allopurinol, phenytoin, calcium channel blockers, cimetidine, quinidine, carbamazepine, gold, are mostly identified reported and are concerned with causing of drug-induced erythroderma which represents the inflammatory condition of the skin resulting with scaling and erythema which in turn affects more than 90% of the body surface. In the present case report, a male patient aged 77 years old with a weight of 52kg was admitted to department of DVI, Sai Siddartha Multi Speciality Hospital, Kakinada, Andhra Pradesh, India. Complaining about symptoms like itchy skin lesions over body since one month and describing his present illness as the rash developed over the trunk and later has been spread to other parts of his body. He further represented the past medical history such as he was diagnosed with pulmonary tuberculosis and was on antitubercular drug therapy with oral 300mg of Isoniazid. Based on the laboratory investigations and as well as based on the WHO-UMC causality ADR assessments information the case was undergone to a confirmatory diagnosis of drug-induced erythroderma which may be probably due to antitubercular drug usage.

INTRODUCTION

Erythroderma is the defined as the term which represents the inflammatory condition of the skin resulting with scaling and erythema which in turn affects more than 90% of the body surface and based on the etiological factor responsible for causing it and is represented a s both contagious and non contagious. [1] The causes are multiple, different as it may be due to chemical or drug induced, eczema, atopic dermatitis, drug eruption, psoriasis, scabies, erythema multiforme, reiters syndrome, pityriasis ruba pilaris, dermatitis hyper petiform, dermatomyositis, scabies, bullous pemphigoid, congenital icthyosiform erythroderma, pemphigus foliaceus, dermatomyositis, sarcoidosis, HIV infection, ofuji papuloerythroderma, graft-versus-host disease, fungal infections, Hailey-Hailey disease, dermatomyositis, staphylococcus scaled-skin syndrome, Neoplasms conditions like multiple myeloma, malignant lymphoma, Sezary syndrome, mycosis fungoides, adult T-Cell leukemia/lymphoma, multiples myeloma, Hodgkins disease and other malignant disorders. [2]

As it is referred to sudden onset and is characterized by clinical manifestations such as intense itching is concerned when palms and soles got affected, fissure in horny cell layer, during chronic stages of eruptions the skin becomes pigmented and appeared as shiny, Acanthosis, hyperkeratosis, nails become rigid and shedding of scalp hair have been observed [2, 3] erythroderma may also leads to complications in severe chronic conditions like fluid loss leading t electrolyte abnormalities in patients ultimately leading to cardiac arrhythmias and further to secondary skin manifestations like cellulites and impetigo sometimes even to pneumonia too as Laboratory findings are referred particularly in the case in which the underlying factor is unknown for the cause for erythroderma. As the treatment includes the recommendations of oral histamines and topical steroids for preventing the further worsening of condition and in the case of systemic symptoms it also includes the supplementation for electrolytes and protein imbalances. [3]

CASE STUDY

A male patient aged 77 year old with weight of 52 kg was admitted to department of DVI, Sai Siddardha Multi Speciality Hospital, Kakinada, Andhra Pradesh, Indi. Complaining with symptoms like itchy skin lesions over body since one month and describing his present illness as the rash developed over the trunk and later has been spread to other parts of his body. He further represented the past medical history such as he was diagnosed with pulmonary tuberculosis and was on anti tubercular drug therapy with oral 300 mg of isoniazid. The patient presented with same problem in the past with the use of same drug but not at the same site and he further added too that no other reactions were founded with the use of other drugs. Patient is not with any liver and renal disorders and he was a known hypertensive and non smoker non alcoholic and not even diabetic too and patient didn't reported any past familial similar complaint history.

His dermatological examination has further added erythema and sealing of the skin has been seen all over the body with multiple lesions over different body parts like thigh, neck and as well as on abdomen and mucous membranous examination in oral cavity has revealed that white plaques were seen on both buccal mucosa and tongue representing the aspects of lower lip and angle of mouth. Whereas no abnormal deviations like conjunctiva, urogenital, nasal mucosa, palms, soles, nails and hair were not noted. The patient vitals were noted as follows BP: 120/80 mmhg, PR: 78/minute, Temp: 98.5°C, RR: 18/minute. The systemic examination showed that the no abnormalities founded in complete abdominal examination and auscultations of lungs were noted as normal. The laboratory investigations were noted as follows CBP:Hb-11gm/dl, LFT: serum proteins albunin:2.1gm/dl, globulin: 4gm/dl, A/G ratio: reverse, RFT- WNC, CUE: NAD, HIV 1,2 anti-bodies: Negative. Based upon the above information the case was undergone to a confirmatory diagnosis of drug-induced erythroderma which may be probably due to antitubercular drug usage.

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Research Article

A PROSPECTIVE STUDY ON ASSESSMENT OF RISK FACTORS AND MANAGEMENT OF LOWER RESPIRATORY TRACT INFECTIONS IN PAEDIATRICS

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ABSTRACT

Aim & Objective: The main aim of the study to assess the risk factors and management of lower respiratory tract infections in the department of pediatrics and PICU, RIMS Hospital, Kadapa. Method: A prospective observational study was conducted for a period of six months from July 2018 – December 2018. Data was analyzed for patient's demographics, risk factors, clinical complications and management. Results: A total of 120 patient's data was collected in duration of 6 months, out of which 85 were male and 35 were female. The maximum number of patients (89) were within the age group 1month-1year (Infants) 105 patients were of pneumonia followed by Bronchiolitis 15. The most commonly seen risk factors were anemia followed by Low birth weight and pollution from biomass fuels etc. No clinical complications and mortality were reported. Most commonly prescribed drugs were Ceftriaxone, Amikacin and syrup Ambroxol and supportive therapy was given. Conclusion: Major risk factors found were Anemia, low birth weight, pollution from biomass fuels, overcrowding, lack of breast feeding, under nutrition. To conclude, our study clearly highlighted various risk factors, incidence of various Lower respiratory tract infections, complications and mortality if any and management of various Lower respiratory tract infections.

KEY WORDS: LRTI, Pneumonia, Risk factors, Clinical complications, Management

INTRODUCTION

Respiratory tract infection (RTI) is defined as infectious disease of the upper or lower respiratory tract[1]. Acute lower respiratory infections include pneumonia (infection of the lung alveoli), as well as infections that affects the airways are acute bronchitis and bronchiolitis, influenza and whooping cough[2]. Pneumonia is inflammation of the air sacs in the lungs in response to an injury, like an infection[3].

It is caused by bacteria, viruses, or fungi, it is transmitted from environment or from people who are infected with them[4].

Bronchiolitis is inflammation of the bronchioles, usually caused by acute viral infection. The most common lower respiratory tract infection in infants and children who are 2 years of age and younger are viral bronchiolitis. Respiratory syncytial virus (RSV) is the most commonly identified infectious agent. Adenovirus, human metapneumovirus, influenza virus, and parainfluenza virus are the other identified pathogens[5].

Bronchitis is an inflammation of your bronchial tubes (the tubes that carry air to your lungs and the bronchial tree) and are of two types of bronchitis: acute bronchitis, and chronic bronchitis[6].

Flu or grippe, also known as Influenza is an acute viral infection of the upper or lower respiratory tract that is noted by fever, chills, and a generalized feeling of weakness and pain in the muscles, and together with varying degrees of soreness in the head and abdomen[7].

Risk Factors: In all the above cases the risk factors are mostly similar and the common risk factors are:

Low Birth Weight, Breast Feeding, Crowding, Overcrowding, Indoor air Pollution, Under nutrition, Incomplete immunization, Passive smoking, Maternal Education, Sex, Preterm Birth, Anemia, Vitamin D deficiency, Birth Interval, Previous Pregnancy, Previous illness, Vitamin A deficiency[8]. The management of lower respiratory tract infections vary from person to person depending on severity of symptom, risk factors, and etiology. The treatment includes Cough medicine, Bronchodilators, Mucolytics, Anti-inflammatory medicines and glucocorticoid steroids, Oxygen therapy, Pulmonary rehabilitation program, Antibiotics[9].

AIM

This study aims at assessing the risk factors and management of lower respiratory tract infections in pediatrics in RIMS Hospital, Kadapa.

OBJECTIVES

The key objectives of the study include:
1. To identify the age group with higher incidence of lower respiratory tract infections

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Impact of promoting healthy lifestyle interventions among adolescents, young adults with polycystic ovarian disease in resource limited settings

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ABSTRACT

Polycystic Ovarian Disease (PCOD) is a reproductive metabolic disorder caused by hormonal imbalances within women of fertile age. Mainstay for treating patients with PCOD includes pharmacological therapy and lifestyle modifications. Lifestyle modifications that play a key role in the management of PCOD are weight management, reduction in stress, physical activity, body mass index and dietary changes. There is sparse information regarding the impact of these interventional parameters among the PCOD women in the literature. This study aims to determine the impact of healthy lifestyle modifications in the management of PCOD among young adults and adolescents. It was a prospective interventional study conducted in the Gynaecology outpatient department in Government General Hospital, Kadapa over the time of 6 months from June 2019 to November 2019. Counseling on lifestyle changes and implementation of healthy lifestyle interventions were given to the study population by using the standard questionnaire forms and post counseling changes were collected after 90 days of visit to the clinic. The statistical significance was done by using the unpaired t-test and graph pad version 8.3.0. The total sample of 30 PCOD patients was compared to before patient counseling on lifestyle modifications and after follow-up. The total population was categorized into 2 groups as adolescents (10%) and young adults (27%). The current study showed that there is a significant association between dietary intervention ($p < 0.0113$) and physical activity scores ($p < 0.029$) among the PCOD patients. In PCOD patient's healthy lifestyle modifications like dietary interventions and Physical activity serves as an effective treatment strategy adjunct to pharmacological therapy and improved the patient reproductive health.

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INTRODUCTION

Polycystic ovarian disease (PCOD) a multiple system metabolic disorder because of hormonal imbalances (Harwood *et al.*, 2007). Its epidemiology ranges from 2-7.5% and 6.3% in Asian countries like India, China and Sri Lanka (Joshi *et al.*, 2014). In most of the health care settings the classification of PCOD patients is mainly based upon the rotterdam criteria that needs existing symptoms like a) Chronic or oligo anovulation b) Presence of excess male sex hormones c) Polycystic ovaries often diagnosed on ultrasound. Aetiological features associated with the PCOD remain unclear, but evidence

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Review Article

A Review on Current Therapeutic Options for COVID-19

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ABSTRACT

The world is ravaged by SARS-CoV-2 infection with more than 45 million cases and 1 million deaths worldwide. And the rate of infection is nowhere appears to slow down. This unprecedented magnitude of pandemic in recent times pushed the world into a state of despair. Currently no treatment is approved and most of the choices are under clinical trials. All the treatment options have to pass through the rigorous studies to get approved. This must take a very long time. In this article, we are evaluating some of the therapeutic options available currently to tackle the COVID-19 at least until a definite treatment or vaccine is available. And we tried to present the differences between flu and COVID-19 and also the past Coronavirus epidemics versus the COVID-19.

Keywords: COVID-19, SARS-CoV-2, Coronavirus, Pandemic, Epidemic.

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FLU vs. COVID-19

Flu and COVID-19 both are respiratory diseases of viral infection. Symptoms and manifestations of the COVID-19 are also similar to Flu. Flu is caused by Influenza virus mainly Influenza A and Influenza B. And the COVID-19 is caused by a novel Coronavirus (SARS-CoV-2). Coronaviruses are a large family known to us for many years. Normally Flu symptoms would appear in 1-4 days but in COVID-19 it may range from 1-14 days indicating that they have developed some evading techniques from the immune system. Flu patients experience symptoms abruptly but in COVID-19 patients experience the symptoms gradually. And shortness of breath is more common with COVID-19 patients. Also COVID-19 is more severe than flu as 15% of COVID-19 patients hospitalized and 5 % require ventilator support, as per WHO. And also mortality is more in COVID-19 than flu as per the initial research.

History and epidemiology of past Coronavirus pandemics

Human Coronavirus first characterized in the 1960s and is popularly known for causing upper respiratory tract infections in children. Recent years saw Corona epidemics like SARS in 2003, MERS (Middle Eastern Respiratory Syndrome) in 2012. Since 2003 five new human Coronaviruses have been identified. The 2003 SARS outbreak put the animal Coronavirus in focus.

The SARS virus was easily grown in tissue culture and enabled its genomic sequencing quickly. And it significantly differed from already known human and animal Corona viruses made it into a new group.

The reported SARS infections were 8098 with 774 related fatalities that affected 29 countries in the 2003-04 outbreak.[1] The case fatality ratio was 11% according to the WHO.

And 2494 infections with 858 related fatalities were reported with 2012 MERS outbreak that affected 27 countries. Case fatality ratio was 34.4% according to the WHO.

As of October end, 45 M cases with nearly 1.2 M deaths were reported due to SARS-CoV-2 affecting 213 countries. Case fatality ratio is 6.84. The rate of admission in ICU in the hospitalized patients for pneumonia is 25.9%. And 25% of patients developed ARDS (acute respiratory distress syndrome).[2]

38 pregnant women with SARS-CoV-2 infection were studied and found that unlike SARS and MERS, COVID-19 did not lead to maternal deaths and in similar to SARS and MERS, SARS-CoV-2 did not pass through placenta to infect fetus. At this point of time there is no evidence that SARS-CoV-2 can infect fetuses by intrauterine or trans placental transmission. Additional information is required to confirm this.[3]

One striking difference between past Corona virus epidemics and COVID-19 is Patients with COVID-19 become fairly infectious even before they start experiencing symptoms. But in SARS and MERS patients became infectious when they were quite sick. The sick people were recognized and treated or at least infection could be prevented to other people by isolating them. But COVID-19 patients tend to infect others even before they start experiencing symptoms. And most of the cases go

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Original Research Article

A study of prescription auditing in inpatient general medicine in tertiary care government hospital

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ABSTRACT

Background: Irrational prescribing is a global problem. Prescription auditing can help to find the medication errors caused by the Inappropriate prescribing. It is the systematic tool for analysing the quality of medical care, including the procedures used for diagnosis and treatment.
Methods: An observational, non-interventional study carried in general medicine department. A list of 10 questions were prepared to assess the appropriateness of prescribing patterns.
Results: A total of 110 prescriptions were collected and audited. Out of 110 prescriptions 6 (5%) prescriptions have therapeutic duplications and 21 (19%) classes of drugs in the prescription have interactions with each other. Found 8 (7%) drug food interactions. Found 100% appropriateness of drug ordered based on patient diagnosis, dosage of drug, frequency of drug, route of administration, drug intended to have a drug order in the medication chart, medication orders are clear, legible, dated, timed, names and signed, medication chart do not have any unapproved abbreviations
Conclusion: This study shows most of the prescribers need to check for drug duplication, drug-drug interactions and drug-food interactions before prescribing the medicines.

Keywords: Prescription audit, Inappropriate prescribing, Drug interactions, Therapeutic duplication

INTRODUCTION

Prescription audit is the systematic, critical analysis provide quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, and the resulting outcome and quality of life for the patients and it is a continuous cycle, involves observational practice, comparing practice with standards, setting standards, implementing changes and observing new practice.[1]

By prescription audit can assess the quality of medical care, because it is based on documented evidence to support diagnosis and treatment. It has an objective evidence and it is a systemic way of evaluating quality of treatment and care provided by the physicians. Prescription audit is designed for a particular purpose that is the objective documentation by and to the doctors for conforming to their own standards.

Irrational prescribing is a global problem. The prescribing pattern should be rational and it is most important because, bad prescribing habits including misuse, overuse and underuse of medicines can lead to unsafe treatment, prolong hospitalization, health hazards, economic burden on the patients and wastage of valuable resources. All these can impact the quality of life of patient.[2]

A set of 'core prescribing indicators' formulated by the world health organization (WHO) for improvement in

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Analysis of the Adverse Drug Reactions and Associated Cost Burden on the Patients in a South Indian Teaching Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. Authors MV and PDR have contributed to the conception, design and data collection. Authors PDR and SVS analyzed the data. The manuscript was written by author MV. All authors read and approved the final manuscript.

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ABSTRACT

Objectives: To analyse the adverse drug reactions (ADR) and related economic burden on the health care system and health seekers
Methods: A prospective observational study was conducted in a South Indian tertiary care teaching hospital from July 2016 – December 2018.ADRs were analyzed for their causality, severity, predictability, and preventability through standard scales and were reported to the Pharmacovigilance Program of India (PvPI) through a specified updated Indian Pharmacopoeia Commission (IPC) suspected ADR reporting form. The total cost burden including both direct and indirect were calculated by assessing the ADR management including the clinical investigations done. The indirect cost was calculated based on the per capita analysis by using the Gross Domestic Product (GDP) of our study area.

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RESEARCH

Open Access

Nephroprotective activity of *Annona Squamosa* leaves against paracetamol-induced nephrotoxicity in rats: in vitro and in vivo experiments

S. Neelima[1*], P. Dwarakanadha Reddy[2] and Chandra Sekhar Kothapalli Bannoth[3]

Abstract

Background: Paracetamol (PCM), being extensively adapted analgesic and anti-inflammatory drug all over the world, beyond therapeutic dosages, the oxidative stress-involved nephrotoxicity has been evidenced. However, herbal plants are the windfall for the humankind providing solution for most of the wellness breakdowns. *Annona squamosa* (AS) is one of such plants with enormous therapeutic and nutraceutical potencies. The main aspiration of the current investigation is to evaluate the nephroprotective ability of ethanolic extract of *Annona squamosa* (EEAS) leaves against paracetamol-induced nephrotoxicity using in vitro human embryonic kidney (HEK)-293 cells and in vivo experiments in Wistar rats through biochemical parameters, oxidative parameters, and histopathological findings.

Results: When HEK-293 cells were incubated with PCM, an increased cell death associated with alterations in the morphology of normal cells was observed. At variable concentrations, HEK-293 cells co-treated with PCM and EEAS extracts gave a significant improvement in cell growth on comparing with PCM treatment showing cytoprotective feature of EEAS with an IC_{50} 28.75 μg/mL. In vivo nephroprotective property was assessed from the amount of blood urea nitrogen (BUN) along with creatinine and uric acid which were reduced ($P < 0.001$) within serum and compact levels of glutathione, catalase, and superoxide dismutase which were termed as GSH, CAT, and SOD, respectively, were increased ($P < 0.001$) in kidney tissue homogenate in the treated groups than the PCM alone group. Results were additionally supported by histopathological observations.

Conclusion: The results exhibited that EEAS has impending benefits against PCM-induced nephrotoxicity through in vitro and in vivo experiments.

Keywords: Nephrotoxicity, Paracetamol, *Annona squamosa*, HEK-293, Oxidative stress

Background

Acetaminophen, most commonly acknowledged with its generic name, paracetamol (PCM), is the last among the threesome of derivatives of para-aminophenol which was introduced at the end of the nineteenth century [1, 2]. PCM is a potent analgesic as well as an antipyretic drug with lesser side effects than aspirin [3]. Even today, there is exactly no alternative to this particular drug in terms of treating fever and mild pains in both children and adults. Since most of the pharmaceutical outlets do not require a prescription to trade with consumers, the abuse is very common. PCM is usually formulated with two strengths; regular strength of 325 mg and higher strength of 500 mg along with this higher dose PCM is also available. In large dose consumption, PCM is known to result in acute kidney and liver necrosis in mammalian species [4–6].

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Review

Prospection of recent chitosan biomedical trends: Evidence from patent analysis (2009–2020)

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ABSTRACT

Improved accuracy is one of the vital innovations in designing biopolymer-based products that are gaining momentum in diverse biomedicine arenas. The innovative devices were developed utilizing synthetic polymers but now are replaced with 'green polymer' such as chitosan. These bioactive polymer-based products can control release therapeutics, even greatly minimize the post-surgery inflammations, immune responses, and are biodegradable. Past decade to date, numerous proprietary technologies have been developed and protected by numerous patents. Therefore, strategical analysis of these chitosan-based process or product patent helps to identify key innovative technologies, clinically implementation, and key manufacturers behind these biomedical products. The present article analyzed the trends in patent portfolios of chitosan-based biomedical products and the number of original research papers published over a decade. A spotlight on different marketed grades, modifications for their special use, blend composites, safety profile, and regulatory concerns of chitosan use in bioengineering are covered. A scientific prospection was performed between 2009 and 2020 using the PubMed database. For technological prospection, Lens (free, open patent, and scholarly search) portal was utilized. Chitosan-originated patents were analyzed using cooperative and international patent classifications, covering their citations by patent count. Various chitosan-based patents that are approved and commercial chitosan based biomedical products are even listed. A preliminary perusal of chitosan alone or based patent portfolios can greatly benefit various stakeholders like scientists and corporate firms for new product development, government agencies for allocation of federal funds shaping up biomedicine advances by utilizing chitosan. The present analysis indicates the overall progression and unexplored corners of chitosan in a current global biomedical proposition.

Contents

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ORIGINAL ARTICLE

Preliminary phytochemical screening, RP-HPLC, HPTLC and anti-oxidant studies of *Pinus maritimus*

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Abstract

Objective: The aim of the present study is to screen for the phytochemical constituents present in the ethanolic extract of whole plant of *Pinus maritimus* (PM). **Method:** The ethanolic extract of the dried whole plant of PM is subjected to preliminary phytochemical screening which showed the presence of major phytoconstituents such as phenols, flavonoids, and alkaloids. The extract was screened for its antioxidant activity by 2,2'-diphenyl-1-picrylhydrazyl, hydroxyl radical, ferric reducing antioxidant potential, and nitric oxide scavenging assay. Further, the ethanolic extract was subjected to fingerprinting technique high-pressure thin-layer chromatography. Reverse-phase high-performance liquid chromatography (HPLC) was performed to estimate the amount of total phenolics, flavonoids, and alkaloids quantitatively in isocratic mode. **Results:** Phytochemical screening of the ethanolic extract of the plant showed the presence of important active constituents such as alkaloids, flavonoids, phenolics, and terpenoids. The study also revealed the potential antioxidant activity of the extract with IC_{50} value. Reverse-phase HPLC showed 0.119 µg/ml of total phenolics, 0.257 µg/ml of alkaloids, and 0.0016 µg /ml of flavonoids. **Conclusion:** Scientific evaluation of this plant was carried out which is very important for the standardization of the plant-based drug. PM is one which has therapeutic importance as it showed important phytoconstituents.

Key words: *Pinus maritimus*, *In vitro* antioxidant, high-performance liquid chromatography, reverse-phase high-performance liquid chromatography

INTRODUCTION

Pinus maritimus (PM) belongs to Pinaceae family. It is an annual herb and is found extensively grown in the region of Eastern and Southern regions of India and also extended in the region between Southeast Asia. The aerial parts and the roots of the plant are used in the treatment of wide variety of ailments such as inflammation, melasma, and osteoarthritis.[1,2] In spite of its wide usage as an herbal treatment, there is no extensive research on the phytochemical screening which is very important for the standardization of the drug. The literature survey revealed that nine different phytocompounds have been isolated and characterized among which three were proved to be effective antioxidant drug.[3,4] Phenolic derivative from aerial parts of the plant showed presence of pycnogenol.[5] The compound Pycnogenol was reported and the studies also showed its role in oxidative stress in several cell systems by doubling the intracellular synthesis of antioxidative enzymes and by acting as a potent scavenger of free radicals.[2] In this present study, attempt is made in the further screening of phytoconstituents which are of biological importance. The study also deals with the quantitative estimation of total phenolics, flavonoids, and alkaloids by reverse-phase high-pressure chromatography.

MATERIALS AND METHODS

Chemicals and Instrument

Ethanol of analytical grade, 2,2'-diphenyl-1-picrylhydrazyl (DPPH) Sigma grade, naphthyl ethylenediamine

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A NOVEL IMMUNOMODULATORY ACTIVITY OF *SIDAGLUTINOSA*-A MAGICAL INDIAN TRADITION MEDICINE

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S. glutinosa, ethanolic extract, immunomodulatory activity, compound purification, LCMS, NMR

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ABSTRACT

Plants are the immense resource of nutrients, therapeutics, immune boosters and anticancer etc. Medically important plants are crucial role players in preventing and curing diseases and disorders. In present study, the ethanolic extract of plant *S. glutinosa* was evaluated for immunomodulatory activity using various *invitro* and *invivo* immunomodulatory models. The extract was subjected for isolation, purification and structural characterization of pure fraction 2 using various analytical techniques. Invivo studies indicated increased cell mediated immunomodulatory activity evidenced by increased phagocytic index *i.e.*, 0.011±0.0003 in Swiss Albino mice orally administered with 200mg/kg/bw dose of ethanolic extract. Dose dependent increase of WBC and time dependent DTH response was noticed in mice treated with high dose of the extract in contrast to control groups. Humoral immune response elicited by 100mg/kg/bw and 200mg/kg/bw of ethanolic extract which showed increased Hemagglutination titer 7.5±0.34. The TNF-α and IL-6 level were found to be 21.5 ± 3.0 and 29.5 ± 0.68pg/ml in mice treated with ethanolic extract of 200mg/kg/bw which strongly supports the immunomodulatory role of ethanolic extract when compared to diseased control. A fraction 2 of ethanolic extract of *S. glutinosa* purified through column chromatography showed single peak at 254nm with RT 1.3minute and a molecular mass of 476.07 Daltons when analyzed by LCMS. ^{1}H and ^{13}C NMR spectrum revealed molecular formula $C_{25}H_{16}O_{10}$. The fraction 2 was further studied for *Invitro* immunomodulation study on RAW 264.7 macrophage cell line which indicated proliferation of RAW 264.7macrophage cell lines and elevated level of TNF-α and IL-6 gene expression.

INTRODUCTION

Plants and microorganism are the unsurpassed sources of most of therapeutic biopharmaceuticals exploredin health care to treat diseases. World Health Organization (WHO) has enlisted around 21,000 medically important plants used throughout the globe. Approximately 2500 plant species discovered in India out of which 150 species are commercially used in pharmaceutical industries for pilot scale production of mainstream drugs [1].It is well known fact that herbal based treatment of diseases is not recent origin and from ancient time plants and their extracts is continuously applied to get rid of many

International Journal of Research in Pharmaceutical sciences and Technology

Utilization of Lipids, Polymers by Modern Techniques for Innovative Pharmaceutical Formulations and Medical Devices

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ABSTRACT

With advancing science and technology, new futuristic technologies have been upcoming that are having a greater impact on the pharmaceutical and biomedical fields. Many lipids and polymer of natural and synthetic origin have spread horizons enabling to reach in fabricating delivery systems for unmet medical needs. In this modern biomedicine era, we must outline and scrutiny the roles of these biomaterials and the modern technologies that are shaping up the advancing medicines. The real challenges in modulating, fine-tuning the biomaterials for their bioactive properties are vital for assessing the in-vivo performance of the developed systems. Therefore, the present review discusses the detailed analysis of the current research reported in the technologies of utilizing the lipids, polymers, and their role in delivering the drugs, genes, and designing advanced implantable medical devices. The scrutiny also focuses on key optimization tools, analytical methods, formulation, and biomedical techniques helpful in developing the solutions that can be administered different routes in different therapeutic indications.

Keywords: Lipids; Polymers; Drug; Gene; Biomedical; Technology; Formulations.

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INTRODUCTION

In the current scenario, many efforts are utilized to use the power of many lipid and polymer based drug delivery systems, as it gives the proper means for site-specific targeting; with time specific controlled delivery of genes/ drugs having various molecular weights, either medium or large, along with bioactive [2]. Furthermore, sparingly water-soluble drugs (II/IV) are real challenges for the formulation specialist about solubility, dissolution and bioavailability. Lipid or polymer-based delivery systems are effective in size dependent attributes therefore gained a lot of attention. Also, these biomaterials or lipids or polymers have taken the lead due to its advantages of having great degree of biocompatibility, biodegradation and tunability. These systems are commercially viable to formulate pharmaceuticals for topical [3], oral [4], parenteral route delivery [5]. Lipid formulations can be modified into different formulations such as Proliposomes [6], Microparticles [7], Solid lipid Nanoparticles [8], Nanoemulsion [9], Nanocrystals [10], Nanowires [11,12], Self-nano emulsifying drug delivery system (SNEDDS) [13], In-situ gels [14], Nanofibers [15], Nanoethosomes [16], various that meet the requirements as per the disease, route of administration. They really safeguard the total cost, long-term product stability, severe toxicity, and better efficacy. Lipid oriented carriers are safe, efficient therefore right candidates for the formulation of drugs, as well as vaccines, diagnostic, and nutraceutical [17]. Therefore, lipid based delivery systems have gained more importance in current years due to their capability to improvise the solubilities and bioavailability's of various drugs and chemical compounds (Figure 1).

Success of lipid-based delivery carrier is upon the empirical experience. Systematic physicochemical investigation of structures and stability's does not help to pace up the progression of newer and improve formulation but helps to know complex mechanism that

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