Proceedings of
2nd National Conference
REACH 2019
(Recent Advances and Challenges in Healthcare)

Theme: Exploring Greener Avenues in Healthcare
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2nd National Conference
REACH-2019
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Theme: Exploring Greener Avenues in Healthcare

Saturday, March 16, 2019

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Objective of Conference

School of Medical and Allied Sciences takes great pride in inviting you to the 2nd national Conference entitled “Recent Advances and Challenges in Healthcare” (REACH) on March 16, 2019 at GD Goenka University. The conference engrosses a vicinuity of conscious discussions among the interdisciplinary scientific community along with unparalleled collaborative opportunities between a large pool of healthcare professionals both from academia and industry.

The theme of proposed conference Exploring Greener Avenues in Healthcare, is an endeavor to disseminate latest advancements in greener and alternative practices in the domain of Healthcare Sciences. The potential of greener alternatives in Pharmaceutical sciences, practice of Physiotherapy as well as Nutrition & Dietetics is to be wholly navigated with substantial evidence in a supported manner. This shall surely be in concordance with Hippocrates famous quote “Let food be thy medicine and medicine be thy food”. The organizers shall attempt to address various challenges associated with greener alternatives by involving eminent scientists under the umbrella of REACH-2019

School of Medical and Allied Sciences is pleased to release the proceedings of REACH-2019 held at GD Goenka University, Gurugram, India.

Prof. Rohit Dutt
Convener, REACH-2019
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ARTICLES
Pharmacological screening of griseofulvin loaded solid lipid nanoparticles for improved oral delivery of poorly water-soluble drug

Hitesh Kumar1,2*, Ashok Kumar Rajpoot1,2, Saurabh Sharma3, Arvind Kumar4

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3Vivek College of Technical Education, Moradabad Road, Post-Agri, Bijnor, Uttar Pradesh, India-246701.
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Abstract
In current research, Griseofulvin-loaded solid lipid nanoparticles (SLNs) were prepared using glyceryl monostearate (GMS) as a lipid by hot homogenisation method. Griseofulvin was selected as a model drug for BCS (Biopharmaceutics Classification system) Class II drugs. Solubility is a major concern for the improvement of oral bioavailability for poorly water-soluble drugs as in case of BCS class II. The SLN batches were optimized based on average particle size, drug entrapment efficiency, drug loading and percentage yield. The optimized SLN composition was characterized in terms of particle shape and size, drug entrapment efficiency, drug loading and in vivo antifungal activity against Microsporum canis using albino rat model for the treatment of dermatophytosis. The bioavailability of drug after oral administration in albino rats was found to be significantly higher as compared to the conventional dosage form of drug. A complete mycological and clinical cure was observed during the study in M. canis infected albino rats. Griseofulvin loaded SLNs were administered orally once daily in infected rats for 7 days. It can be concluded from our study that SLNs improves the oral delivery of poorly water soluble drugs like griseofulvin that belongs to BCS Class II drugs.

Keywords: Griseofulvin, Solid lipid nanoparticles, BCS Class II, In-vivo study.

INTRODUCTION

The oral route is the most common and convenient method of drug administration to the patients, however, oral administration of drugs often lead to degradation due to the highly acidic gastric environment, enzymes of the mucosa or liver, before they enter the systemic circulation. In drug discovery, the number of drug candidates having low solubility has increased, and approximately 70% of new drug candidates have shown poor aqueous solubility in recent years. Currently, approximately 40% of the marketed immediate release (IR) oral drugs are categorized as practically insoluble. The Biopharmaceutics Classification System categorizes drug substances into four categories based on their
solubility and intestinal permeability. BCS Class II represents low solubility/high permeability (class II). Generally, the bioavailability of a BCS class II drug is rate-limited by its dissolution, so that even a small increase in dissolution rate sometimes results in a large increase in bioavailability. Various approaches to overcome the poor aqueous solubility of drug candidates have been investigated in drug research and development. A promising strategy to overcome these problems involves the development of suitable drug carrier systems. The antifungal agent griseofulvin is also poorly water soluble drug and belongs to BCS Class II drugs. SLNs are colloidal carriers made up of lipids that remain solid at room temperature and body temperature and also offer unique properties such as small size (50-500 nm), large surface area, high drug loading and the interaction of phases at the interfaces, and are attractive for their potential to improve performance of pharmaceuticals, nutraceuticals and other materials [1-5].

MATERIALS AND METHODS

Materials
Griseofulvin was obtained as a gift sample from Glaxo SmithKline Pharmaceuticals Ltd., Mumbai. Glyceryl monostearate (GMS) and Tween 80 was purchased from S.D. Fine Chemicals, Mumbai, India. All other chemicals were of reagent grade and purchased from Merck and S.D. Fine Chemicals, Mumbai, India.

Preparation of solid lipid nanoparticles

Hot homogenisation method
The SLNs were prepared successfully by this method using Glyceryl monostearate (GMS) as lipid carriers, tween 80 as a surfactant and PVA (Polyvinyl alcohol) as a stabilizer. In this method, Glyceryl monostearate was melted above its melting point i.e. 81°C and the drug Griseofulvin was dissolved in it. The solution of Tween 80 and PVA was prepared in purified water and heated to the same temperature as that of drug solution. The drug lipid mixture was added drop wise to the hot aqueous solution of surfactant with continuous stirring to make o/w pre-emulsion. The mixture was homogenised at a speed of 2000 rpm for 1 hour. The mixture was then cooled down to the room temperature to give Solid lipid nanoparticles. The resultant mixture was filtered through membrane filter and SLNs were collected.

Result and Discussion
The Griseofulvin loaded solid lipid nanoparticles were prepared by hot homogenisation method using $3^2$ factorial design. Total 27 batches were formulated by taking different concentrations of lipid (GMS), surfactant (Tween 80), and stabilizer (Polyvinyl Alcohol). All batches were evaluated for average particle size, entrapment efficiency, drug loading and percentage yield. Based on evaluation, batch GMS-9 was selected as optimized batch on the basis of the smallest particle size, high entrapment efficiency and drug loading.

IN-VIVO STUDIES
**Animals**
Male albino rats (200-250 g) were utilized for in-vivo experimental studies. SLNs formulation GMS-9 was selected for in-vivo studies on the basis of their average particle size, entrapment efficiency, drug loading and percentage yield. All the animal studies were conducted in accordance with the protocol approved by the Institutional Animal Ethical Committee of Moradabad Educational Trust Group of Institutions Faculty of Pharmacy, Moradabad (Registration No. METGI/FOP/CPCSEA/ 2018/04).

**Acute toxicity study**
The acute toxicity of Griseofulvin was evaluated at doses of 50, 100, 200, 400, 800 and 1600 mg/kg, as per the OECD 423 guideline, and dose of 1600 mg/kg represented toxic indications. Therefore, in agreement with OECD guideline 423, it is expressed as a LD50 cut off value. Doses, 100 mg/kg, bodyweight were preferred for pharmacological inspection by fixed-dose methods [6].

**Experimental design**
The drug was administered orally as a plain drug suspension and optimized SLNs (GMS-9) in albino rats. The animals were divided into three groups, each group containing five animals. The first group was treated as control and was fed with Phosphate Buffered saline solution (pH 7.4) by oral route. Second and third groups were treated with a single dose of plain griseofulvin suspension in buffered saline solution (pH 7.4) and griseofulvin loaded SLNs (GMS-9) (equivalent to 100 mg griseofulvin per kilogram of body weight) respectively by oral route. Blood samples were withdrawn at 1, 2, 4, 6, 8, 12, and 24 h after dosing. The blood samples were centrifuged, and 100 μl of plasma was separated and immediately frozen until required for analysis. The plasma samples were deproteinized with 100 μl of acetonitrile containing paraphenyl phenol, shaken on a vortex mixture, and centrifuged, and 20 μl of the supernatant was analysed by high-performance liquid chromatography method [7]. Separation was carried out on reversed-phase column, and the column effluent was monitored using ultraviolet detector at 290 nm. The mobile phase was 45% acetonitrile in 0.1 M acetic acid (pH 3.5) at a flow rate of 1 ml/min.

**Table 1. Drug plasma concentration time profile studies after oral administration of**

<table>
<thead>
<tr>
<th>Plain griseofulvin suspension and griseofulvin loaded SLNs</th>
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<td>7</td>
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</tbody>
</table>
Fig 1: Drug plasma concentration time profile studies after oral administration of Plain Griseofulvin suspension and Griseofulvin loaded SLNs

Table 2. Pharmacokinetic Data of Plain and Griseofulvin loaded SLNs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Parameters</th>
<th>Griseofulvin suspension</th>
<th>Griseofulvin loaded SLNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>C1h μg/ml</td>
<td>0.37</td>
<td>1.00</td>
</tr>
<tr>
<td>2.</td>
<td>AUC 0-24 μg/ml h</td>
<td>22.36</td>
<td>41.56</td>
</tr>
<tr>
<td>3.</td>
<td>Cmax μg/ml</td>
<td>1.54</td>
<td>2.98</td>
</tr>
<tr>
<td>4.</td>
<td>Tmax h</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 3. Antifungal efficacy of griseofulvin loaded SLNs against M. Canis fungal strains

<table>
<thead>
<tr>
<th>Dermatophytes</th>
<th>Colony count (cfu/ml)</th>
<th>Linearity equation</th>
<th>$R^2$</th>
<th>Zone of Inhibition for SLNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Canis</td>
<td>$5.4 \times 10^5$</td>
<td>0.234x +1.50</td>
<td>0.992</td>
<td>2.83±0.05</td>
</tr>
</tbody>
</table>
RESULT AND DISCUSSION
In vivo studies revealed that SLNs formulation exhibited a much faster absorption and reached a peak concentration in plasma (Cmax) faster as compared to plain griseofulvin, which exhibited slow absorption. When plain drug was administrated orally, it did not attained higher concentration in the blood and showed higher Tmax due to poor solubility and absorption profile. When the solid lipid nanoparticles were subjected to agar plate diffusion, it was observed that the drug encapsulated in SLNs was effective against M.Canis dermatophytes strains and shows significant zones of inhibition (Table 3). Hence, the pharmacological screening of griseofulvin loaded SLNs found to be improved bioavailability of drug after oral administration in albino rats as compared to the conventional dosage form of drug.

CONCLUSION
The In-vivo pharmacokinetic studies indicated potential of developed griseofulvin loaded solid lipid nanoparticles formulation for faster absorption and augmenting the bioavailability of griseofulvin. The developed system has also shown potential of maintaining higher level of griseofulvin for a longer period of time as compared to plain griseofulvin, which suggested that this system can also act as a depot formulation inside the body. From the present study, it can be concluded that SLNs can be used efficiently for enhancing bioavailability of griseofulvin via oral route.

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REFERENCES

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Pharmacological screening of Cyclosporine for the solubility enhancement and bioavailability

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³Vivek College of Technical Education, Moradabad Road, Post-Agri, Bijnor, Uttar Pradesh, India-246701.
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ABSTRACT

In the current research, The Self Emulsifying Drug Delivery system (SEDDS) for Cyclosporine is developed and evaluated for feasibility of oral administration. The objective behind the research was to increase the solubility of cyclosporine through Self Emulsifying Drug Delivery System that will increase the bioavailability and reduce the side effects of the drug. The SEDDS was prepared by hot homogenisation method and evaluated for droplet size, zeta potential, polydispersity index, drug loading, in-vitro study and in-vivo study. From experimentation, it was found that In-vivo studies were carried out in albino rats and the pharmacokinetic parameters were compared with a marketed formulation, which indicated better results of the prepared formulation than the marketed one. So it is concluded that self-emulsifying drug delivery system hold potential as a drug delivery system for drug with poor aqueous solubility.

Keywords: Cyclosporine, Bioavailability, hot homogenisation method, In-vivo study.

INTRODUCTION

It is well known that the oral route is the first choice clinically for drug administration due to better patient compliance. However, most new chemical entities (approximately 60% of drugs) coming directly from chemical synthesis are poorly water-soluble and a large fraction of them are even poorly permeable across the bio membrane in the gastrointestinal tract (GIT). According to the definition of Biopharmaceutics Classification System (BCS), these drugs are categorized as BCS IV. Consequently, BCS IV drugs yield the most challenging absorption problems such as low drug dissolution, efflux by transporters in the gut wall, and first-pass effect by metabolic enzymes. This study utilized cyclosporine A (CyA), which is a cyclic polypeptide containing eleven amino acids and used as immunosuppressive, as a model drug. CyA is classified as a BCS IV drug due to its physicochemical properties, including
high lipophilicity, polar surface area, and molecular weight. The factors impeding the absorption of CyA include the narrow absorption window in the upper gut, P-glycoprotein efflux from enterocytes, and extensive pre systemic metabolism in the wall and liver. To date, how to improve CyA’s in vivo performance has been a widespread concern, and various oral drug carriers have emerged, such as solid dispersion, nanosuspensions, liposomes, lipid NPs., On the other hand, these preparations are alcohol free delivery systems that only require low concentrations of surfactant, thus their toxicity is expected to be diminished compared to the dosage forms on the market. In this paper we aim to evaluate the oral bioavailability of cyclosporine loaded self-emulsifying drug delivery system and Neoral® was used as reference formulation. [1-4]

MATERIALS AND METHODS

Materials

Cyclosporine A was collected as a gift sample from Sandoz Pharma, Switzerland. Commercially available Neoral® was purchased from the local market. Stearic acid and Tween 80 were purchased from S.D. Fine Chemicals, Mumbai, India. All other chemicals were of reagent grade and purchased from S.D. Fine Chemicals, Mumbai, India.

Preparation of Self emulsifying drug delivery system (SEDDS)

Hot homogenisation method

The Self emulsifying drug delivery system of cyclosporine was prepared successfully by this method using stearic acid as lipid carriers, tween 80 as a surfactant, PVA as a stabilizer. In this method, stearic acid was melted above its melting point i.e. 70°C and the drug Cyclosporine A was dissolved in it. The solution of Tween 80 and PVA was prepared in purified water and heated to the same temperature as that of drug solution. The drug lipid mixture was added drop wise to the hot aqueous solution of surfactant with continuous stirring to make o/w pre-emulsion. The mixture was homogenised at a speed of 1500 rpm for 1 hour. The mixture was then cooled down to the room temperature to give Self emulsifying drug delivery system. The resultant mixture was filtered through membrane filter and Self emulsifying drug delivery system of cyclosporine was obtained.

OPTIMISATION OF BATCH

The Self emulsifying drug delivery system of cyclosporine was prepared by hot homogenisation method using $3^2$ factorial design. Total 27 batches (F-1 to F-27) were formulated by taking different concentrations of lipid (Stearic Acid), surfactant (Tween 80), and stabilizer (Polyvinyl Alcohol). All batches were evaluated for average particle size, entrapment efficiency, drug loading and percentage yield. Based on evaluation, Batch F-10 was selected as optimized batch on the basis of the smallest particle size, high entrapment efficiency and high drug loading.
IN-VIVO STUDIES

Male albino rats (250-300 g) were utilized for in-vivo experimental studies. Optimized batch F-10 was selected for in-vivo studies on the basis of their average particle size, entrapment efficiency, drug loading and percentage yield. All the animal studies were conducted in accordance with the protocol approved by the Institutional Animal Ethical Committee of Moradabad Educational Trust Group of Institutions Faculty of Pharmacy, Moradabad (Registration No. METGI/FOP/CPCSEA/ 2018/05).

EXPERIMENTAL DESIGN

The animals were divided into four groups, each group containing six animals. The rats were fasted overnight and then each group was given a different cyclosporine A formulation. The first group was treated as control and was fed with PBS solution (pH 7.4) by oral route. Second group was treated with a single dose of plain cyclosporine A suspension in buffered saline solution (pH 7.4). Third and fourth groups were treated with a single dose of cyclosporine loaded SEDDS (F-10) in buffered saline solution (pH 7.4) and Neoral (marketed formulation) by oral route. The normal human dose of Cyclosporine is 5 mg/kg of body weight. This dose was converted into animal dose by using the formula given below:

\[ \text{HED} = \frac{\text{Animal dose in mg/kg}}{\left(\frac{\text{animal body weight in kg}}{\text{human body weight in kg}}\right)^{1/3}} \]

Where HED = Human equivalent dose.

Animal body weight = 0.280 kg

Human body weight = 60 kg

By using this formula, dose of Cyclosporine given to rats was obtained 280 μg. Hence, each of 3 formulations was administered at the dose of 280 μg Cyclosporine. Blood samples were withdrawn at 0.30, 1, 2, 4, 6, 8, 12, and 24 h after dosing. The blood samples were centrifuged, and 100 μl of plasma was separated and immediately frozen until required for analysis. The plasma samples were deproteinized with 100 μl of acetonitrile containing Para phenyl phenol, shaken on a vortex mixture, and centrifuged, and 20 μl of the supernatant was analysed by high-performance liquid chromatography method. Separation was carried out on reversed-phase column, and the column effluent was monitored using ultraviolet detector at 215 nm. The mobile phase was 45% acetonitrile in 0.1 M acetic acid (pH 3.5) at a flow rate of 1 ml/min.
Table 1. Peak plasma concentration in albino rats receiving different formulations

<table>
<thead>
<tr>
<th>S. No</th>
<th>Time (hr)</th>
<th>Plain drug</th>
<th>Optimised Batch (F-10)</th>
<th>Marketed formulation</th>
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<tr>
<td>1</td>
<td>0.30</td>
<td>3.0</td>
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<td>2</td>
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<td>8</td>
<td>24</td>
<td>1.2</td>
<td>1.7</td>
<td>1.6</td>
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Table 2: Mean pharmacokinetic parameters of cyclosporine following oral administration of three dosage forms

<table>
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<th>S. No</th>
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<th>Optimised Batch (F-10)</th>
<th>Marketed formulation</th>
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<tr>
<td>1</td>
<td>AUC(μg*hours/mL)</td>
<td>8.67</td>
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<td>2</td>
<td>C_{max} (μg/mL)</td>
<td>2.8</td>
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<td>T_{max} (hrs)</td>
<td>4.08</td>
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<tr>
<td>6</td>
<td>Vd</td>
<td>98.08</td>
<td>88.353</td>
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<td>7</td>
<td>Total CL</td>
<td>34.58</td>
<td>8.91</td>
<td>6.89</td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSION

The current study showed the fact that cyclosporine-loaded self-emulsifying drug delivery system can be prepared with high entrapment efficiency using low stabilizer concentration. The pharmacokinetics of Cyclosporine incorporated into SEDDS following a single dose oral administration of 5 mg/ kg was investigated in albino rats using the marketed micro emulsion (Neoral®) as reference. According to the pharmacokinetic data, blood levels of the drug after oral Administration of this delivery system, part of...
the drug remains incorporated in the intact SEDDS is taken up from the intestinal lumen by the
lymphatic transport and goes into the systemic circulation, where the drug reaches the target and
delivery takes place. These particles were efficient in controlling the drug release in-vitro and in-vivo.
All Pharmacokinetic parameters show favourable results. The self-emulsifying drug delivery system
formulation showed significantly improved intestinal uptake and oral bioavailability as compared to
Sandimmune Neoral®. Most importantly, the self-emulsifying drug delivery system formulation
exhibited lower nephrotoxicity upon the chronic administration in rats as compared to the commercial
formulation. So it is concluded that self-emulsifying drug delivery system hold potential as a drug
delivery system for drug with poor aqueous solubility.

CONCLUSION

The In-vivo pharmacokinetic studies indicated potential of developed cyclosporine loaded Self
emulsifying drug delivery system formulation for faster absorption and showed increased
bioavailability of Cyclosporine the developed system has also shown potential of maintaining higher
level of Cyclosporine for a longer period of time as compared to marketed one. From the present study,
it can be concluded that Self emulsifying drug delivery system can be used efficiently for enhancing
bioavailability of Cyclosporine via oral route.

ACKNOWLEDGMENT

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Institutions Faculty of Pharmacy, Moradabad for providing research facilities.

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Phytochemical standardization of extracts of *Aerva javanica* Linn. flowering tops through determination of total phenolic, flavonoid and flavonol content

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Sarvesh Paliwal⁴

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³School of Medical & Allied Sciences, GD Goenka University, Haryana
⁴Banasthali Vidyapith, Rajasthan

**ABSTRACT**

*Aerva javanica* (*Amaranthaceae*) is a grey coloured woolly perennial tomentose shrub. It’s traditional and folklore usage motivates further investigation on its pharmacognostic parameters and pharmacological potential. Therefore, in order to establish its standardization parameters, few phytochemical determinants were analysed using UV-spectrophotometer, which include- total phenolic, flavonoid and flavonol content. Hydro-alcoholic extract (CE) was prepared from flowering tops of *A. javanica*. In order to work further on activity guided fractions, diethyl ether (DEE) and ethyl acetate (EAF) fractions were prepared. Total phenolic content was determined using gallic acid as standard- 116.627 mg Gallic Acid Eq/g for CE, 243.930 mg GA Eq/g for DEE fraction and 201.230 mg GA Eq/g for EAF fraction. Total flavonoid content was determined using quercetin as standard- 14.000 mg Quercetin Eq/g for CE, 48.500 mg Q Eq/g for DEE fraction and 2.500 mg Q Eq/g for EAF fraction. EAF had shown maximum flavonol content (13.201 mg Rutin Eq/g) followed by DEE (2.167 mg Rutin Eq/g) and CE (0.521 mg Rutin Eq/g) using rutin as standard. These parameters along with other phytochemical constants will help further in selection of high quality drug.

**Keywords:** *Aerva, total phenolic, rutin , total flavonoid, total flavonol, quercetin*

**INTRODUCTION**

Folklore usage of herbs in various ailments motivates research of traditional drugs in modern system. Indigenous medical system is much more explored to develop drugs from plants.[1] Traditional use of *Aerva javanica* flower tops is the basis of present study. Chopra (1956) reported its traditional use as demulcent, diuretic, anthelmintic and also in headache. Swellings were reported to be removed by administration of plant decoction.[2,3]
Aerva javanica Linn. (Amaranthaceae) also known as ‘Patharphori’, is a grey colored woolly, perennial, suffruticose, hoary-tomentose, erect to scendent dioecious conspicuous under shrub, 0.6-1 m tall. It belongs to family Amaranthaceae. It is native to the region from North Africa to South West Asia (Willis1966; Gupta 1992). It is found almost throughout plains of India.[4,5]

The present study was undertaken to standardize the drug and evaluate the presence of important ingredients and of special concern polyphenolics of selected drug in order to select the fraction for further pharmacological investigations.

**Experimental**

**Total phenolic content:**

1 ml of stock solution of the extract was taken into a 10 ml volumetric flask and mixed with 5 ml of double distilled water and 0.6 ml of Folin Ciocalteu’s reagent. After 5 minutes, 1.6 ml of sodium carbonate solution (20 % w/v) was added and volume was made up to 10 ml with double distilled water (concentration of extract in study in final solution was 100 µg/ml). The same process was followed to prepare samples of standard. *Calibration curve:* The absorbance was measured by scanning at 765 nm in uv-spectrophotometer after 30 minutes. Calibration curve was prepared by plotting absorbance of gallic acid against concentrations (final concentration 6-30 µg/ml) of standard- gallic acid. % of total phenolics was calculated from calibration curve and total phenolics were expressed as µg of Gallic acid equivalent per gram of extract (µg GA Eq/g).[6]

**Total flavonoid content:**

To determine of flavonoid content of drug extracts, aluminum chloride colorimetric method was used. 2 ml of distilled water and 1 ml of plant extract (1 mg/ml) was added to the 10 ml volumetric flask. After 5 minutes, 3 ml of 5 % sodium nitrite and 0.3 ml of 10 % aluminum chloride was added. After 6 minutes, 2 ml of 1 M sodium hydroxide was added and the volume was made up to 10 ml with water. Absorbance of pink chromogen was measured at 510 nm v/s blank. Calibration curve was prepared by using quercetin (10-250 µg/ml) as standard and platting their absorbance against concentrations. % of total flavonoids was calculated from calibration curve of Quercetin expressed as % Quercetin.[6]

**Total flavonol content:**

The calibration curve was prepared using standard- rutin by mixing 2 ml of 0.5–0.015 mg/ml rutin ethanolic solutions with 2 ml aluminium tri chloride and 6ml sodium acetate. Volume was made up to 10 ml with double distilled water (ddw). The absorption at 440 nm was read after 2.5 h at 20°C using UV spectrophotometer. Sample solutions of extracts were prepared using the same procedure with 2ml of plant extract instead of rutin solution. All determinations were carried out in triplicate and the mean...
values were used. Total flavonols were estimated as rutin equivalents calculated from calibration curve, expressed as mg rutin equivalent per gram extract (mg rutin E/g extract).[7]

RESULTS AND DISCUSSIONS

Figure 1 Total Phenolic content: Calibration curve of standard Gallic acid

![Figure 1 Total Phenolic content: Calibration curve of standard Gallic acid](image)

Figure 2 Comparative total phenolic content for various extracts and fractions

All values are expressed as mean ± SD of three observations. Total phenolic content expressed as mg of gallic acid equivalent per gram of extract. AJ- *Aerva javanica* suffixed with CE- complete extract, EAF- ethyl acetate fractions and DEE- diethyl ether fraction

![Figure 2 Comparative total phenolic content for various extracts and fractions](image)

Figure 3 Total flavonoid content- Calibration curve of standard- Quercetin

![Figure 3 Total flavonoid content- Calibration curve of standard- Quercetin](image)
Figure 4 Comparative- total flavonoid content of extract and fractions

All values are expressed as mean ± SD of three observations. Total flavonoid content expressed as mg of Quercetin equivalent per gram of extract. AJ- *Aerva javanica* suffixed with CE- complete extract, EAF- ethyl acetate fractions and DEE- diethyl ether fraction

Figure 5 Calibration curve of standard- Rutin for total flavonol content

Figure 6 Comparative total flavonol content of extract and fractions

All values are expressed as mean ± SD of three observations. Total flavonol content expressed as mg of Rutin equivalent per gram of extract. AJ- *Aerva javanica* suffixed with CE- complete extract, EAF- ethyl acetate fractions and DEE- diethyl ether fraction

Total phenolic content was determined using Gallic acid as standard and extracts used were complete extract (AJCE), ethyl acetate fraction (AJEAF) and diethyl ether fraction (AJDEE) (being rich in polyphenolics) (Figure 1 & 2). Diethyl ether fraction (AJDEE) showed maximum phenolic content (244 mg GA Eq/g extract) followed by ethyl acetate fraction (AJEAF) (201 mg GA Eq/g extract) and complete extract (116 mg GA Eq/g extract). This indicated that diethyl ether is the best among the used solvents to dissolve out phenolic contents of extract.
Total flavonoid content was determined using Quercetin as standard and extracts used were complete extract, ethyl acetate fraction and diethyl ether fraction (being rich in polyphenolics) (Figure 3 & 4). Diethyl ether fraction (AJDEE) showed maximum flavonoid content (48.5 mg Quercetin Eq/g extract) followed by complete extract (AJCE- 14 mg Quercetin Eq/g extract) and AJEAF. This indicated that diethyl ether is the best among the used solvents to dissolve out flavonoid contents of extract.

Total flavonol content was determined using Rutin as standard and extracts used were complete extract, ethyl acetate fraction and diethyl ether fraction (being rich in polyphenolics) (Figure 5 & 6). Ethyl acetate fraction (AJEAF) showed maximum flavonol content (2.167 mg Rutin Eq/g extract) followed by complete extract (AJCE- 0.521 mg Rutin Eq/g extract) and AJEAF. This indicated that ethyl acetate is the best among the used solvents to dissolve out flavonol contents of extract.

CONCLUSION
From the overall observation this can be concluded that for extraction of flavonol contents of drug/extract ethyl acetate may be used as solvent of choice, while for flavonoid fraction of polyphenolics, diethyl ether may be used as solvent of choice. Total polyphenolics are best isolated in diethyl ether solvent.

Standardization done on the basis of phyto-chemistry will be further helpful for researchers to select the appropriate fractions of extract to work with, for pharmacological as well as detailed phytochemical investigation.

REFERENCES

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Determining incidence and factors associated with Sacroiliac joint pain among thermal power plant employees of N.T.P C Dadri

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ABSTRACT

Background: Thermal power plant industry is gruesome; both physically and psychologically as it involved various procedures and operations. Therefore it is expected that professionals are prone to develop Work related Musculoskeletal Discomfort (WMSD). The study was aimed to find incidence SI joint involvement as cause of low back pain and to elucidate its relationship with associated risk factors such as age, BMI, tenure, working hours/week etc. Method: In the present cross-sectional study, out of a population of 798 employees, 138 returned a duly filled questionnaire and volunteered to participate further. 62 subjects were shortlisted who had pain in their low back/ hips and thighs, with or without pain radiating down to the legs after Cornell Musculoskeletal Discomfort Questionnaire score calculation. They were further assessed using cluster of six tests (Gaenslen’s test, SI joint distraction & compression test, Sacral thrust & Thigh thrust test and Patrnick test). Subjects were marked positive for SI joint when 3 out of 6 tests were positive. Logistic regression was used to analyze its association with risk factors. Results: 62 (44.9%) subjects have their low back/ hips and thighs, with or without pain radiating down to the legs. 50 (36.2%) & 12 (8.7%) subjects were diagnosed with low back pain and SI joint pain respectively. Presence of sacroiliac joint pain was significantly associated with the variables age [45-54 years (OR = 9.737); 25-34 years (OR = 3.231)], work hours/week [45 hours/week (OR= 9.459), 40 – 45 hours/week (OR = 4.019)], service tenure (OR = 55.75) and shift hours [single & fixed shift (1.053); unfixed rotatory shifts (0.950)]. Discussion & Conclusion: The study highlighted that uneven shift pattern and working hours/week were significantly associated with presence of SI joint pain. Further dual relationship of age and work tenure with sacroiliac pain which peaks in the initial and later years was reflected.

Keywords: SI Joint Pain, Incidence, Thermal Power Plant

INTRODUCTION:

With today’s sedentary lifestyle and prolonged postures at workplace, prevalence of work related musculoskeletal disorders (WMSDs) has increased multifolds throughout the world. LBP
remains predominant occupational health problem in most industrialized countries, accounting for 20% to 30% of all worker’s compensation claims and up to 50% of all direct compensation costs [1]. The WHO in its booklet of ‘Preventing Musculoskeletal Disorders at Workplace’ has issued guidelines, risk factors and precipitating factors for various work-related musculoskeletal disorders with special emphasis on low back pain [2]. The risk factors can be categorized into occupational and non-occupational factors. The major occupational risk factors include repetition, force, awkward/static postures, duration of exposure and vibration [3].

In the Thermal power plant industry, various procedures and operations are involved starting from the coal crushing to electrical energy generation. Based on these operations, both the blue and white collar workers are employed in different working sections as per the nature of work to be done and the supervision required for the same. The workload in this industry is gruesome, both physically and psychologically, as a minor fault can lead to a major accident. As these professionals are exposed to such different occupational and environmental risk factors, therefore it is expected that they may be prone to develop WMSDs, however limited work has been done in this regard.

Over the years, many studies have been done on LBP in IT professionals however very limited work has been done in this concerned yet important industry, though work on the prevalence of LBP in the Kosovo Plant, Korea has been done [1]. Still no further differential diagnosis of mechanical LBP has been done so far and nor has the possibility of Sacro- Iliac (SI) joint involvement as a cause of LBP in such extreme and demanding work conditions has been explored. The purpose of this paper was to find the prevalence of sacroiliac joint pain among the white collar section of the thermal power plant workers working in N.T.P.C Dadri. Further factors predisposing to Sacroiliac joint pain white collar section of thermal power plant workers will be identified.

METHODOLOGY:

In the present cross-sectional study, samples were recruited from the Operations and Maintenance department (O&M) of National Thermal Power Cooperation Limited (N.T.P.C), Dadri power plant, aged 18 years and above (both male & female), able to understand English, willing and able to give informed consent. A survey questionnaire consisting of Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) to find the prevalence of Low Back Pain and in addition a few questions inquiring about their demographic information, professional information, etc. was distributed among the white collar employee section of the department that was duly filled and returned back to the surveyor. Out of a population of 798 employees, 138 returned a duly filled questionnaire and signed the consent form. Further, the CMDQ scores of the survey were calculated, and only those subjects were shortlisted who had pain in their low back/hips and thighs, with or without pain radiating down to the legs. The shortlisted subjects were examined in the physiotherapy department of the N.T.P.C limited. Subjects with history of Cauda equina syndrome, spinal fracture, inflammatory or tumor back conditions, osteoporosis of the spine, psychiatric illness and spinal surgery were excluded. The differential diagnosis of the subject’s low back pain was done using Lanslett test cluster of five tests,
namely, Gaenslen’s test, SI joint distraction test, SI joint compression test, Sacral thrust test and Thigh thrust test, and an additional FABER Patricker test. Those subjects positive of at least 3 out of the 6 test cluster, were marked positive and rest marked negative for sacroiliac joint pain. Logistic regression was used to analyze the relationship between the independent [age range (years), Sub-departments of O&M section, work hours per week (WH/week), tenure range (years), work shift and Body Mass Index (BMI)] and the dependent variable (SI joint pain) using the SPSS version 16. Descriptive analysis of data was done using frequency percentage of incidence using pivot table in the Microsoft Excel version 2007.

RESULTS:

SI Joint pain and Age: Out of the 138 responses, 50 subjects had low back pain with/without radiation, 12 had SI joint pain with/without radiation. SI joint pain was the highest in the age group of 45-54 years being 66.67%, followed by age group 25-34 years (25%). Multiple logistic regression found that the odds of presence of sacroiliac pain was the highest for the age groups 45-54 and 25-34 with their odds of incidence values being 9.737 and 3.231 respectively. On observing the bimodal pattern of the probability of presence of sacroiliac pain as the age progresses, it was found that the odds of incidence of the pain was comparatively lesser in the age group 35-44, with its OR value being 2.842, and that the odds of presence of sacroiliac pain was least in the oldest age group of 55-64 and its odds value was 0.004.

SI Joint pain and Departmental frequency: The highest number of positives for the sacroiliac joint pain was seen in the Operations section of the O&M department (33.33%) followed by the Chemistry and Control & Instrumentation (C&I) sections (16.67%).

SI Joint pain and Working hours: The odds of incidence of sacroiliac joint pain increased with increasing number of hours per week spent at work. With each unit increase in the weekly working hours in the group of 40-45 hours of work per week, the chances of presence of sacroiliac joint pain increase by a factor of 4.019; and for a unit increase of more than 45 hours weekly at work, the odds of incidence also increases by a factor of 9.459.

SI Joint pain and Work tenure: Odds of presence of sacroiliac pain was found to be the highest in the employees with more than 25 years of experience in the same job with a value of 55.749, followed by the tenure period of 5-10, 20-25 and 15-20 years in a descending order of their values of odds ratio which are 2.154, 1.523 and 1.066 respectively.

SI Joint pain and BMI: Sacroiliac pain distribution also was also found to be higher in the subjects with BMI greater than or equal to 24. In subjects having SI joint pain, 83.33% had body mass index either equal or more than 24. While only 16.67% of SI pain positive subjects were of the BMI less than 24.

SI Joint pain and Work shifts: The shift timings had a clean sweep relation with the occurrence of sacroiliac pain. 69.35% subjects with sacroiliac pain were working in the general shift, while 27.42% of SI pain positive subjects were in the changing shifts of morning, evening and night.

DISCUSSION:
The study aimed at finding the prevalence of sacroiliac joint pain among the various sections of employees working in the power plant, which is the O&M department, of N.T.P.C Dadri. 12 were positive for SI joint pain, making to 8.7% of the survey responding population, and 19% of the back and hip pain complaining subjects. The results were in agreement with the studies done in the past stating that 13%-30% back pain cases are due to sacroiliac joint pain [4,5,6]. In present study, the sacroiliac joint pain had a bimodal distribution over age. In a systematic review by Cohen et al (2013), similar bimodal incidence of painful SI joint was observed with highest prevalence being in the younger athletes and the elderly population [6]. With increase in age osteophyte formation increases and pain is more of degenerative type whereas in the young adults the preponderance to inflammation due to greater intra-articular shear and force closure can be attributed to this dual age related pain distribution [7].

Operations section of the O&M department had the highest frequency of sacroiliac pain with 33.33% frequency rate. In a power station, the operations department has the maximum number of employees who are responsible for taking care of various equipment and controls in the plant, responsible for the functioning of Unit Control Rooms. Since a power plant generates electricity 24X7, so the operations section also works all the time, with workforce distributed in shifts. The sudden up rise of SI pain reporting cases unlike that for low back pain in the chemistry sub-department can be explained by the prolonged sitting nature of their job, which is a known cause of SI pain [8]. Shahul Hameed (2013) in his study on finding the prevalence of low back pain in the IT industry in India, found that the subjects complaining of low back pain had a mean work hours per week of 46.4 hours, and those without LBP had a mean of 44.72 hours of work per week [9]. Similar results were found in our study as well, with 91.67% of the SI pain complaining subjects working for more than 45 hours per week, clearly attributing overwork as a predisposing risk factor for the development of SI pain as well. Our study was in accordance with the past studies done by Murtezani et al (2011) and many other researchers correlating tenure and LBP, that can be well attributed to the accumulation of spinal loading and spine moving towards creep over due course of years [1]. However, unlike LBP, SI joint pain saw a curvilinear distribution with maximum in the tenure period of 5-10 years in the same field, and a lower and equal distribution over the tenures of 15-20 years and >25 years. Onyemaechi et al (2016) in their study explained the additional tilting of the pelvis anteriorly with overweight and obesity, which on remaining uncorrected leads to development of creep within the ligamentous structures of the SI joint and developing pain and dysfunction [10]. In conjunction with this, present study recognized that the subjects developing pain in sacroiliac joint, all had a BMI inclined towards the becoming overweight and obese.

CONCLUSION:

Study indicated 8.7% prevalence of sacroiliac joint pain among the responding power plant employee population, and 19% of the work related LBP was due to sacroiliac joint pain. The study highlighted that uneven shift pattern and working hours/week were significantly associated with
presence of SI joint pain. Further dual relationship of age and work tenure with sacroiliac pain which peaks in the initial and later years was reflected.

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Assessment of superoxide scavenging and total antioxidant potential of hydroalcoholic extract of *Aerva javanica* Linn. flowering tops

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**ABSTRACT**

*Aerva javanica* (*Amaranthaceae*) is a grey coloured woolly perennial tomentose shrub. Its traditional and folklore usage motivates further investigation on its pharmacognostic parameters and pharmacological potential. Therefore, in order to establish its antioxidant potential, superoxide scavenging and total antioxidant potential were determined. Hydro-alcoholic extract (CE) was prepared from flowering tops of *A. javanica*. In order to work further on activity guided fractions, diethyl ether (DEE) and ethyl acetate (EAF) fractions were prepared. For both models, ascorbic acid was used as standard antioxidant compound. Superoxide scavenging potential in term of SOD expressed as IC₅₀ which was 149.464 µg/ml for complete extract (CE), 113.228 µg/ml for DEE and 61.904 µg/ml for EAF in contrast to 132.413 for standard ascorbic acid. This was equivalent to 6.691 Eq SOD units/mg (CE), 8.832 Eq SOD units/mg (DEE) and 16.154 Eq SOD units/mg (EAF) per mg of sample respectively against 7.552 Eq SOD units/mg of standard. Total antioxidant capacity was found to be 70.33 mg Ascorbic acid Eq/g, 143.67 mg Ascorbic acid Eq/g and 283.67 mg Ascorbic acid Eq/g. Results indicated the SOD values and total antioxidant power of DEE and EAF fractions even better than standard ascorbic acid which expressed the prospective potential of fractions (DEE and EAF) against metabolic disorders.

**Keywords**: Aerva, SOD, superoxide, antioxidant, ascorbic acid

**INTRODUCTION**

Folklore usage of herbs in various ailments motivates research of traditional drugs in modern system. Indigenous medical system is much more explored to develop drugs from plants.[1] Traditional use of *Aerva javanica* flower tops in is the basis of present study. Chopra (1956) reported its traditional use as demulcent, diuretic, anthelmintic and also in headache. Swellings were reported to be removed by administration of plant decoction.[2,3] *Aerva javanica* Linn. (*Amaranthaceae*) also known as ‘Patharphori’, is a grey colored woolly, perennial, suffrutescent, hoary-tomentose, erect to scandent dioecious conspicuous under shrub, 0.6-1 m tall.[4,5]
The present study was undertaken to evaluate the extract and its fractions for their involvement in scavenging of oxidative radicals. In this order, their superoxide scavenging and total antioxidant capacity were evaluated.

**EXPERIMENTAL**

**Collection and extraction:**

*Aerva javanica* flowering tops were collected from forests of Jhalana in periphery of Jaipur, Rajasthan and authentication was done at “Department of Botany, University of Rajasthan, Jaipur” (Voucher specimen no #RUBL2116644)(Authentication certificate Ref. no.: Bot/2017/5424 dated 13/02/2017). Hydro-alcoholic (50-50) extract was prepared from air dried plant materials using maceration method. Fractionation was carried out by first defatting and then by solvents of increasing polarity (dielectric constant). Solvents used for this purpose were petroleum ether, diethyl ether, ethyl acetate, benzene, acetone, and ethanol.

**Superoxide Scavenging:**

Different concentrations of extracts were prepared. Alkaline DMSO (1 ml DMSO containing 5 mM NaOH in 0.1 ml water) and nitro blue tetrazolium (NBT) 20 mM (50 mg NBT in 10ml phosphate buffer pH 7.4) solutions were prepared. 1.5 ml of sample of different concentrations was taken and 2 ml alkaline DMSO was mixed and vortexed with it. To this mixture 0.6ml NBT reagent solution was added and vortexed. Final mixture was measured for absorbance @560 nm under UV spectrophotometer.

Scavenging of superoxide free radicals by extracts and fractions was calculated using following formula as % scavenging:

\[
\% \text{Scavenging} = 100 - \left( \frac{\text{Abs of control} - \text{Abs of sample}}{\text{Abs of control}} \right) \times 100
\]

**Total Antioxidant:**

10mg/ml stock solutions of extracts were prepared in water. 0.1ml of extract solution was mixed with 1 ml of the reagent solution (0.6 M sulphuric acid, 28 mM sodium phosphate and 4 mM ammonium molybdate). Test tubes were covered from top and incubated at 95°C for 90 min. After cooling to room temperature, the absorbance was measured at 695 nmin UV spectrophotometer (Shimadzu). Ascorbic acid was used as standard and calibration curve was prepared which was used to calculate total antioxidant activity in terms of number of equivalents of ascorbic acid per gram extract. [6,7]

**RESULTS AND DISCUSSIONS**

Table 1: Superoxide scavenging- absorbance under UV-spectrophotometer

<table>
<thead>
<tr>
<th>Conc. (µg/ml)</th>
<th>Absorbance</th>
<th>Ascorbic acid</th>
<th>AJCE</th>
<th>AJDEE</th>
<th>AJEAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.125</td>
<td>0.055</td>
<td>0.114</td>
<td>0.159</td>
<td>0.218</td>
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</tr>
<tr>
<td>62.500</td>
<td>0.131</td>
<td>0.152</td>
<td>0.234</td>
<td>0.334</td>
<td></td>
</tr>
<tr>
<td>125.000</td>
<td>0.309</td>
<td>0.269</td>
<td>0.373</td>
<td>0.600</td>
<td></td>
</tr>
<tr>
<td>150.000</td>
<td>0.412</td>
<td>0.324</td>
<td>0.411</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>250.000</td>
<td>0.671</td>
<td>0.424</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>500.000</td>
<td>--</td>
<td>--</td>
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</tr>
</tbody>
</table>

*AJ- Aerva javanica extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction*
**Figure 1** Comparative Superoxide scavenging activity of various fractions

*AJ- *Aerva javanica* extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction

**Table 2:** Superoxide scavenging in terms of Eq. SOD for various fractions

<table>
<thead>
<tr>
<th>Sample type</th>
<th>Linear equation</th>
<th>Correlation co-efficient ($R^2$)</th>
<th>IC$_{50}$ ($\mu$g/ml)</th>
<th>Eq. SOD units /mg ext. or std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascorbic acid</td>
<td>$y = 0.421x - 5.746$</td>
<td>0.988</td>
<td>132.413</td>
<td>7.552</td>
</tr>
<tr>
<td>AJCE</td>
<td>$y = 0.216x + 10.99$</td>
<td>0.975</td>
<td>149.464</td>
<td>6.691</td>
</tr>
<tr>
<td>AJDEE</td>
<td>$y = 0.316x + 14.22$</td>
<td>0.996</td>
<td>113.228</td>
<td>8.832</td>
</tr>
<tr>
<td>AJEAF</td>
<td>$y = 0.604x + 12.61$</td>
<td>0.998</td>
<td>61.904</td>
<td>16.154</td>
</tr>
</tbody>
</table>

*IC$_{50}$ value is equivalent to 1 unit of SOD; *AJ- *Aerva javanica* extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction

**Figure 2** Comparative SOD of various extracts and fractions

*AJ- *Aerva javanica* extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction. SOD activity was expressed as equivalent SOD units/mg of extract

**Figure 3** Total antioxidant- calibration curve for standard ascorbic acid
Table 3: Total antioxidant capacity of various extracts and fractions

<table>
<thead>
<tr>
<th></th>
<th>AJCE</th>
<th>AJDEE</th>
<th>AJEAF</th>
</tr>
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<tbody>
<tr>
<td>µg Ascorbic acid Eq/mL</td>
<td>70.33 ± 2.517</td>
<td>143.67 ± 10.07</td>
<td>283.67 ± 5.69</td>
</tr>
<tr>
<td>µg Ascorbic acid Eq/µg extract (c/a) # (d)</td>
<td>0.070 ± 0.003</td>
<td>0.144 ± 0.01</td>
<td>0.284 ± 0.01</td>
</tr>
<tr>
<td>mg Ascorbic acid Eq/g (e)</td>
<td>70.33 ± 2.517</td>
<td>143.67 ± 10.07</td>
<td>283.67 ± 5.69</td>
</tr>
</tbody>
</table>

# a=1000 µg/ml dilution factor for all sample; all values are expressed as mean±SD. *AJ- Aerva javanica extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction

Figure 4 Comparative total antioxidant capacity of various extracts and fractions

*AJ- Aerva javanica extract, suffixed with CE-complete extract; DEE- diethyl ether fraction; EAF- ethyl acetate fraction. Total antioxidant capacity was expressed in terms of mg of Ascorbic acid equivalent per gram extract.

SOD activity was found to be shown maximum by ethyl acetate fraction of *Aerva javanica* (16.15 equivalent SOD unit/mg of extract) followed by diethyl ether fraction (AJDEE) (8.83 eq. SOD unit/mg of extract) and complete hydroalcoholic extract (AJCE) (6.69 eq. SOD unit/mg of extract). The activity of AJEAF and AJDEE was found even better than standard ascorbic acid (7.55 eq. SOD unit/mg of extract) used.

Ethyl acetate fraction of *Aerva javanica* had shown maximal total antioxidant capacity (283.67 mg Ascorbic acid Eq/g) followed by diethyl ether fraction (AJDEE) (143.67 mg Ascorbic acid Eq/g) and complete hydroalcoholic extract (AJCE) (70.33 mg Ascorbic acid Eq/g). Higher SOD and total antioxidant capacity in diethyl ether and ethyl acetate fractions were due to the fact that diethyl ether and ethyl acetate contain more of polyphenolics which are, by nature, powerful antioxidant. Whereby, ethyl acetate fraction contains more powerful antioxidant as compared to diethyl ether fraction.

CONCLUSION

From the results of present study, this can be concluded that extracts in study possess powerful antioxidants which are more firmly distributed in diethyl ether and ethyl acetate fractions. The possibility of counteracting oxidative stress by a pool of proper antioxidants plus an appropriate diet, mainly in patients whose blood antioxidant deficiencies can be easily rebalanced, may have real health benefit and represent a promising way of inhibiting the progression of disease.

REFERENCES

1956;186–7.

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E-mail: skswarnkar@gmail.com
Effectiveness of 6 weeks of combined exercises and breathing exercises on factors of diabetes control in Asian Indian type 2 diabetes patients

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Amity Institute of Physiotherapy, Amity University, Sector-125 Noida.
Sumitra Hospital, Noida

Abstract

Background: Breathing exercises and aerobic exercises have shown improvement in glycemic regulation. Objective: To investigate the effects of combined (aerobic + resistance) exercises program and breathing exercises on glycemic outcomes (HbA1c), fasting blood glucose (FBG), lipid profile and well-being in type 2 diabetes patients. Methods: 45 Individuals (25 M, 20 F) aged 40-70 years with type 2 diabetes were randomly distributed to a 6-week program Results: General well-being (GWB) improved by 17.46% and 21.48% (p<0.05) in the both group A and B respectively. Significant improvement was also observed in all cardiovascular parameters. Conclusion: Breathing exercises and combined (aerobic+ resistance) exercise protocols were effective in improving glycemic control as well as cardiovascular fitness parameters. However, combined exercise programs demonstrated better efficacy as compared to breathing exercises group. Keywords: Type 2 diabetes, breathing exercises, combined exercises, general well being

INTRODUCTION

India dominates globally withholding the largest number of diabetes people, hence has been labeled as the “diabetes capital of the world” [1]. It is known that Indians in spite of varied geographical and ethical origin are prone to [2]. Asian Indians develop insulin resistance and metabolic syndrome at an early age as compared other ethnic population [3]. It has been observed that there is a lack of interest among Asian Indian to adopt physical activity as the preferred treatment for the cure of type 2 diabetes.[4]

There is a strong evidence present that suggests role of physical activity in improving type 2 diabetes [5]. Aerobic activity such as walking is a low intensity exercise and is the most preferred form of exercise[4]. Aerobic and endurance exercise should be there in intervention programs[6] This training together with resistance training in patients with T2DM seems to provide better positive result of controlling glucose, functioning of insulin, exercise tolerance and muscular strength [2].

Deep breathing exercise helps in reducing the stress level of people suffering from diabetes and different other problems like anxiety, panic attacks and irritability and if body is not getting enough oxygen then sighing and yawning signs can be seen [5].
It was our aim to evaluate the improvement performing combined exercises and breathing exercises by diabetic patients over a 6-week walking program as well as monitor improvement in the glycemic and cardiovascular fitness parameters as well as resting heart rate (RHR) and general well-being (GWB).

**EXPERIMENTAL**

The prospective randomized control study was conducted at the Amity University, Noida, Uttar Pradesh and Sumitra Hospital, Noida, Uttar Pradesh. The baseline demographic data of the study is given in Table 1. **Participants:** A total of 60 type 2 diabetes mellitus patients (35 Men and 25 Women) were taken from Delhi NCR region, out of which 15 were drop outs and 45 patients fulfilled the criteria. Men and Women aged 40 to 70 years were included in this study. The study was approved by Institutional Ethical Committee, Amity Institute of Physiotherapy, Noida, Delhi. The interventions were employed after getting medical clearance from the diabetologist for the subjects to participate in the intervention study[6]. **Procedure:** Eligible participants were diagnosed with type2 diabetes, aged between 40 and 70 years, not taking insulin.. Subjects underwent a physical examination and medical screening to exclude individuals with subjective or objective evidence of severe orthopedic/cardiovascular/respiratory conditions restricting physical activity[2].

**Table-1: Demographic data of the study**

<table>
<thead>
<tr>
<th>GROUP-A (n=15)</th>
<th>GROUP-B (n=15)</th>
<th>GROUP-C (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>51.4±9.68</td>
<td>54±4.47</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>163.58±6.21</td>
<td>159.12±7.23</td>
</tr>
<tr>
<td>Weight(kg)</td>
<td>76.38±10.34</td>
<td>68.81±13.87</td>
</tr>
<tr>
<td>BMI</td>
<td>28.4±2.72</td>
<td>27.06±4.56</td>
</tr>
</tbody>
</table>

Subjects were randomly placed into one of the three groups by random lottery approach. All subjects in Group A were taught with breathing exercise protocol. Group B were introduced with aerobic and resistance exercise protocol. Group C was control group.

**Group A Breathing exercises (Group A)** Participants were asked to perform deep breathing exercises protocol. It was an adopted protocol[4] consisting of 5 exercises: (a) Abdominal Breathing, (b) Abdominal lift, (c) Rapid abdominal breathing, (d) Alternate nostril breathing and (e) extended abdominal breathing.

**Aerobic and resistance exercise (Group B)** Participants were asked to Walk twice a week starting from 15 min per session and they were asked to increase their total weekly walking time by 10 min every week. Resistance training were instructed to perform twice a week where each session should include 10 min of warm up and cool down period before and after the exercise protocol. Following
Strength activities were adopted[2]. **Group C:** Subjects underwent no training but continued with medication as before. They were not engaged in any kind of active exercise intervention during the entire study period. Subjects were tested on two occasions using identical protocols. Pre and post intervention. [7]. **General well-being (GWB):** 12 items administered questionnaire of Clare Bradley Royal Holloway University of London was used with permission to assess general well-being, positive well-being, negative well-being and energy among all subjects[9].

**Statistical analysis**

The significant difference between means values of metabolic profile, body composition, cardiovascular indices and general well-being between pre-training and post-training was done using paired $t$-test. ANCOVA was done to assess the post-training effect between two groups. SPSS 20.0 statistical software was used for data analysis. In this study, $P$-value less than 0.05 have been considered as statistically significant.

**RESULTS AND DISCUSSION**

Subject’s in group A and Group B showed a significant decrease in glycosylated hemoglobin values whereas group B showed no improvement (Table 2). In FBG, Table 2 demonstrates that both subjects in group A and in group B decreased blood glucose levels. In terms of percentage change group A and B showed 11.56% and 17.48% improvement respectively. However, 3.7% increase was noted in group C. However, in ANOVA, it did not show any significant result.

SBP showed a percentage decrease of 3.2% as compared to pre intervention baselines in group A. DBP decreased by 12.6% in group A ($P < 0.05$) (Table 2). RHR was significantly lowered in group A by 9.9 and 1.4% in group B. Un-paired $t$-test shown significant results after training (Table 2) for SBP and DBP in between both groups. There was an increase in GWB scores by 17.46% in group A and 21.48% in group B. In the group C there was decrease in GWB scores by 9.8%. The changes were statistically significant for both groups at $P < 0.001$ during the un-paired $t$-test comparisons (Table 2).

**Table-2: Changes in metabolic profile among control group (C), breathing group (A) and combined exercise group (B).**

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>One-way ANOVA</th>
<th>Post-Hoc (Bonferroni)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBG (mg/dl)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PRE</td>
<td>147.39±40.09</td>
<td>174.31±51.03</td>
<td>154.40±52.3</td>
<td>1.26</td>
<td>.294</td>
</tr>
<tr>
<td>POST</td>
<td>139.28±33.93</td>
<td>159.90±43.98</td>
<td>144.13±37.6</td>
<td>1.162</td>
<td>.329</td>
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<tr>
<td></td>
<td>PRE</td>
<td>POST</td>
<td>P VALUE</td>
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<tr>
<td><strong>HbA1C (%)</strong></td>
<td></td>
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</tr>
<tr>
<td>PRE</td>
<td>7.120±1.2196</td>
<td>6.853±1.0106</td>
<td>.000</td>
<td></td>
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<tr>
<td>POST</td>
<td>7.353±0.9884</td>
<td>7.113±0.860</td>
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<tr>
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<td>8.773±1.025</td>
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<td></td>
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<td>.003</td>
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<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
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<tr>
<td><strong>CHOLESTROL (mg/dl)</strong></td>
<td></td>
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<tr>
<td>PRE</td>
<td>179.44±55.75</td>
<td>173.47±27.60</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>POST</td>
<td>214.82±43.30</td>
<td>200.35±25.93</td>
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<tr>
<td></td>
<td>174.80±27.2</td>
<td>179.80±34.4</td>
<td>.000</td>
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<td></td>
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<td>.048</td>
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<td></td>
<td></td>
<td></td>
<td>.096</td>
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<tr>
<td><strong>SBP (mmHg)</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PRE</td>
<td>128.67±19.13</td>
<td>129.67±9.155</td>
<td>.024</td>
<td></td>
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</tr>
<tr>
<td>POST</td>
<td>128.67±14.6</td>
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<tr>
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<td>128.00±20.6</td>
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<td>.011</td>
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<tr>
<td></td>
<td>.99</td>
<td>.52</td>
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<td>0.85</td>
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<tr>
<td></td>
<td>0.34</td>
<td>.799</td>
<td></td>
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<tr>
<td><strong>DBP (mmHg)</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PRE</td>
<td>87.33±15.796</td>
<td>85.33±7.898</td>
<td>.080</td>
<td></td>
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</tr>
<tr>
<td>POST</td>
<td>90.33±16.847</td>
<td>80.00±11.802</td>
<td>.726</td>
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<td>87.33±17.91</td>
<td>86.67±10.96</td>
<td>.013</td>
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<td>.158</td>
<td>.18</td>
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<td></td>
<td>0.41</td>
<td>.498</td>
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<tr>
<td><strong>GWB</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PRE</td>
<td>26.93±3.7</td>
<td>28.47±3.20</td>
<td>.015</td>
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<tr>
<td>POST</td>
<td>28.93±5.23</td>
<td>31.53±4.01</td>
<td>.056</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.80±3.0</td>
<td>17.60±2.5</td>
<td>.98</td>
<td></td>
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</tr>
</tbody>
</table>
DISCUSSION
The goal of study was to compare the two intervention program breathing exercise and combined exercise protocol, to observe which one is better and hence helpful in improving the glycemic index, cardiovascular co-variates and wellbeing of type 2 diabetes mellitus patients[7]. The effect of aerobic activity has been observed in literature and it is known that physical activity improves insulin sensitivity. However, Asian Indian lack awareness regarding the efficacy of deep breathing exercises. Hence, with this objective the current study was formulated to see the efficacy of combined exercises( aerobic+ resistance) and deep breathing exercises in type 2 diabetes patients. Results of the current study show that overall improvement was observed in both group A and B. it could be attributed to the fact that both the intervention programs were done under the supervision of the therapist and participants were encouraged to be physically active during the course of their activity, needs and demands of the patients were also considered during the program [7]. Improvement was seen in the metabolic fitness, quality of life, well being and physiological changes in participants. To determine blood glucose and risk of complication reduction in HbA1c level is an important goal for any diabetes related intervention. In our study participants in the initial level had a high level of HbA1c and hence after following the intervention program it was reduced. Further, it has been reported that Slow Sine wave Breathing (around 6 Breaths a minute) triggers PNS response; improves oxygenation by expanding bronchioles pathways in the lungs. Stimulation of PNS inhibits SNS thereby reversing insulin resistance. Reduced insulin resistance decreases Blood glucose levels.[7,8] Hence, the results corroborated with the literature highlighting the efficacy of deep breathing exercises.. In the present study we noticed that following parameters: Positive well being, energy and general welling was highly significant in group B and negative well being was in significant. Group c has highly significant result in negative well being. Hence breathing exercises have not showed any impact on any of 4 parameters. Therefore, it can be concluded that combined exercise group has an impact on well being of diabetes patients[1,2].

CONCLUSION
The study indicated that combined exercises protocol consist of aerobic and resistance exercises, improved with 6 week intervention program. Hence we can conclude that both the approaches breathing and aerobic/ resistance exercises were effective and physical activity prescription should be made depending upon an individual’s inclination, time and social factors, and hence psychological factors of type 2 diabetes mellitus patients are improved by combined exercise protocol.

For access W-BQ12 questionnaire
The W-BQ12 questionnaire is available from Professor Clare Bradley, Health Psychology Research, Department of Psychology, Royal Holloway, University of London, Egham Surrey TW20 EX, United Kingdom. Email: c.bradley@rhul.ac.uk.

REFERENCES

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Exploration of autonomic involvement in mechanism of antinociceptive activity of flowering top extract of *Aerva javanica* Linn.

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1LBS College of Pharmacy, Jaipur, Rajasthan, India
2Banasthali Vidyapith, Banasthali, Rajasthan, India

**ABSTRACT**

*Aerva javanica* (Amaranthaceae) is a grey colored woolly perennial tomentose shrub. Its traditional and folklore usage motivates further investigation on its pharmacognostic parameters and pharmacological potential. Therefore, in order to establish its mechanism behind its antinociceptive potential, involvement of autonomic receptors was explored. Hydro-alcoholic extract (AJCE) was prepared from flowering tops of *A. javanica*.

Acetic acid writhings model was used to explore receptor involvement. Wistar rats were pre-treated with receptor blockers of autonomic system like atropine, yohimbine, prazosin, phenylphrine or clonidine and then with drug (AJCE- 500 mg/kg body weight p.o.) and effect on abdominal writhings was observed as % inhibition indicating responses of extract with and without both adrenergic (by prazosin and yohimbine) and cholinergic (by atropine) blockage. Further, cholinergic involvement was found significant (p<0.05). Effects were not significant enough to state the proper involvement of any type of α-adrenergic (peripheral and central both) autonomic receptor but significant (p<0.001) involvement of β-adrenoceptors was suggested. Involvement of cholinergic receptors was also obtained (p<0.05) with flowering top extract of *Aerva javanica*. Therefore, there is still a need to work on selectivity of β-adrenoceptor and cholinergic involvement.

**Keywords:** atropine, adrenergic, yohimbine, prazosin, cholinergic, phenylephrine, clonidine

**INTRODUCTION**

Folklore usage of herbs in various ailments motivates research of traditional drugs in modern system. Indigenous medical system is much more explored to develop drugs from plants.[1] Traditional use of *Aerva javanica* flower tops in is the basis of present study. Chopra (1956) reported its traditional use as demulcent, diuretic, anthelmintic and also in headache. Swellings were reported to be removed by administration of plant decoction. Thereby, it may be suggested that plant is having antioxidant potential which is responsible for its traditional activity.[2,3]

*Aerva javanica* Linn. (Amaranthaceae) also known as ‘Patharphori’, is a grey colored woolly, perennial, suffrutiocose, hoary-tomentose, erect to scandent dioecious conspicuous under shrub, 0.6- 1
m tall. It belongs to family Amaranthaceae. It is native to the region from North Africa to South West Asia (Willis 1966; Gupta 1992). It is found almost throughout plains of India.[4,5]

Therefore, the present study was undertaken to explore the involvement of autonomic receptors in antinociceptive activity of flowering top extract of *Aerva javanica* drug.

**METHODS**

*Collection, authentication and extraction of plant material:*

*Aerva javanica* plant material collection was carried out from forests of Jhalana, Jaipur, Rajasthan. Collected plant materials were authenticated at Department of Botany, University of Rajasthan, Jaipur and by renowned botanist (Authentification certificate no. *Bot/2017/5424* dated 13/02/2017). Air dried plant material was subjected to extraction using hydro-alcoholic (50-50) solvent using maceration method. To prevent microbial growth 5 ml of chloroform was added to each vessel. The same is kept for 7 days with intermittent shaking. After seven days these were filtered and marc left after filtration was subjected to wash twice with hydro-alcoholic solvent to extract any residual components. The solvent was removed by evaporation and concentrated to syrupy consistency.

*Pharmacological investigation:*

Male wistar rats (180-220 gm) were used for study at Department of Pharmacy, Banasthali Vidyapith, Rajasthan and protocol was approved by Institutional animal ethical committee (IAEC) of Banasthali University, Rajasthan (approval no. *BV/3632/2017-2018*). All the animal handling, maintenance and procedures were carried out in accordance to CPCSEA guideline.[6]

To elucidate the possible involvement of autonomic receptor system, Acetic acid was used to induce abdominal writhing as described by Mohd. Sani *et al.* Method of De Souza et al (2009) was followed to select the doses of drugs administered and to elucidate the possible involvement of receptor systems followed by pain (abdominal writhing) induction using acetic acid.[7,8]

Rats were divided into groups of 6 animals in each as per protocol and group-wise selected receptor agonist or antagonist was given as pre-treatment- atropine (10 mg/kg, BW i.p.), yohimbine (0.15 mg/kg, BW i.p), prazosin (0.15 mg/kg, BW i.p), phenylphrine (10 mg/kg, BW i.p.) or clonidine (0.15 mg/kg, BW i.p.) 15 minutes before the administration of extract fraction (500 mg/kg, BW p.o.). The pain was induced using 0.6% acetic acid 60 minutes after the administration of AJCE or vehicle. The number of writhing was counted cumulatively over the period of 25 minutes, 5 minutes following acetic acid injection.

**RESULTS AND DISCUSSIONS**

**Table 4:** Effect on acetic acid induced abdominal writhings- Involvement of various receptor systems

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of writhings/ abdominal contractions</th>
<th>% inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>81 ± 1.1</td>
<td>--</td>
</tr>
<tr>
<td>Diclofenac*</td>
<td>28 ± 0.9</td>
<td>65.43</td>
</tr>
<tr>
<td>Compound</td>
<td>Value</td>
<td>Effect</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Atropine (AT)</td>
<td>78 ± 1.4</td>
<td>3.70</td>
</tr>
<tr>
<td>Prazocine (PR)</td>
<td>81 ± 1.7</td>
<td>0.00</td>
</tr>
<tr>
<td>Phenylephrine (PH)</td>
<td>44 ± 0.9</td>
<td>45.68</td>
</tr>
<tr>
<td>PH + PR</td>
<td>68 ± 1.3</td>
<td>16.05</td>
</tr>
<tr>
<td>Yohimbine (YO)</td>
<td>77 ± 1.1</td>
<td>4.94</td>
</tr>
<tr>
<td>Clonidine (CL)</td>
<td>63 ± 1.4</td>
<td>22.22</td>
</tr>
<tr>
<td>YO + CL</td>
<td>80 ± 1.8</td>
<td>1.23</td>
</tr>
<tr>
<td>AJCE</td>
<td>55 ± 1.2</td>
<td>32.10</td>
</tr>
<tr>
<td>AJCE + atropine</td>
<td>49 ± 1.1</td>
<td>39.51</td>
</tr>
<tr>
<td>AJCE + yohimbine</td>
<td>57 ± 1.6</td>
<td>29.63</td>
</tr>
<tr>
<td>AJCE + prazosin</td>
<td>53 ± 1.3</td>
<td>34.57</td>
</tr>
</tbody>
</table>

Control - 0.5% w/v sodium CMC, * standard treatment. Analyzed statistically using One way ANOVA followed by post hoc Tukey's multi-comparisons test. Results were compared with control, standard-diclofenac and respective receptor blocker, with all groups and extracts in between (with and without blocker) as represented in receptor table 1. Significant level represented as * (p<0.05), ** (p<0.01), *** (p<0.001). ns- no significant difference; PR- Prazosin, PH-Phenylephrine, YO-Yohimbine, CL-Clonidine

**Figure 1 Effect of extracts on abdominal writhings- Involvement of adrenergic system**

**Figure 2 Effect of extracts on abdominal writhings- Involvement of cholinergic system**

To study the possible involvement of adrenergic system, various adrenergic blockers (yohimbine, prazosin and pindolol) with or without agonist (phenylephrine, clonidine) and AJCE were used in various groups (Figure 1, Table 4). AJCE showed very significant (p<0.001) reduction in abdominal writhings as compared to control group. But effect was not comparable with standard diclofenac. There
found no significant blockage of antinociceptive response of extract when treated with yohimbine (α2) and prazosin (α1), the receptor blockers of α-adrenergic receptor. Significant difference (p<0.001) in depression of writhes were seen when extract group was compared with extract and pindolol (a non-selective β-blocker) group. This over-ruled the assumption of involvement of any subtype of α-adrenergic receptor but supports the probable involvement of β-adrenergic receptor. [9] Selectivity in β-adrenergic receptor involvement needs to be investigated.

Possible involvement of cholinergic system was studied by using atropine- a nonselective cholinergic antagonist (Figure 2, Table 4). Significant (p<0.05) increase in writhings were observed with atropinization (blockage by atropine) which suggest that there may be few compounds present in extract that might be showing cholinergic potential. Inhibition of writhings was seen even after blockage which suggested that there might be involvement of cholinergic receptors and further some compounds may be showing adrenergic and cholinergic involvement. This may be due to the presence of broad range of components in crude extract.

**CONCLUSION**

Out of autonomics receptors, β-adrenoceptors and cholinergic receptors showed their involvement in antinociceptive action of extract flowering top extract of *Aerva javanica*, while there was no involvement of α-adrenoceptors. Therefore, there is still a demand to work on specific cholinergic, β-adrenergic and more receptors to explore their involvement in antinociceptive action. There is also a need to further fractionate the extract and to move on isolation of components to explore the specific mechanism involved.

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Need for risk factor surveillance of Inflammatory Bowel Disease in Indian settings

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ABSTRACT

Purpose: This review was done to explore the risk factors of Ulcerative colitis and Crohn’s disease in an Indian setting. Methods: A literature search was conducted using the database PubMed for studies published between 2012 and 2018 and focusing on the population-based studies on humans showing epidemiology and risk factors of IBD. Results: Ten studies were included in the final analysis from which only two studies (n=2) specified the exact location. The factors such as age, gender, smoking, alcohol, family history, treatment history, diet, access to hygiene and sanitary facilities, extent of disease and use of OCP was significantly associated with the outcome. Conclusion: Further research is needed to explore the risk factors and epidemiology of Ulcerative colitis and Crohn’s disease in particular and to find the preventive measures for IBD patients.

Key Words: Inflammatory Bowel Disease, Review Article, Epidemiology, Risk Factors, Prevalence.

INTRODUCTION

Inflammatory bowel disease (IBD), comprising Crohn’s disease (CD) and Ulcerative colitis (UC) is a chronic immunologically mediated disease at the intersection of complex interactions between genetics, environment and gut micro biota. In addition, there is recognition that the genetic risk factors do not act in isolation but in synergy with the external environment as well as the internal “environment” namely the gut micro biota. The development of IBD is governed by a series of interactions between these three spheres, which simultaneously not only increase the complexity of disease pathogenesis, but also offers several avenues for intervention and improvement of patient outcomes.

The two chronic, relapsing, and remitting conditions have no permanent drug cure and can result in significant long-term morbidity. UC affects only the colon and is primarily confined to the mucosal and to a lesser degree, the sub mucosal compartments. In contrast, CD can involve any component of the gastrointestinal tract from the oral cavity to the anus and may involve all layers of the gut. The incidence of IBD is now rising in developing countries and is increasingly considered an emerging global disease; the populations previously considered ‘low risk’ (such as India) is witnessing an increase in incidence. Sood et al have recently reported an incidence and prevalence of ulcerative colitis of 6.02 per 100,000 and 44.3 per 100,000 populations in India respectively [2]. Incidence is higher in urban than in rural population [3].

Only a few reports, involving a few patients, have been published from India in recent years. [2]Population based studies are needed to authenticate the apparent temporal rise and the regional differences in incidence and prevalence of IBD and definition of etiological factors. These have to be undertaken from different parts of the country, especially from south where CD seems to be highly prevalent compared to north. Ideal epidemiological study should ensure universal accessibility to health care; a population based sample, standardized case definition, relevant database/registries with appropriate validation and prospective data collection. Most published studies are hospital-based which are likely to underestimate incidence as more severe disease is only seen. But there might be true increase in incidence due to rapid industrialization, urbanization and change in diet and lifestyles [1].

Previous studies have shown that the proportion of patients with UC was higher that of CD [5]. There appears to be a North-South divide with more Ulcerative colitis (UC) in north and Crohn’s disease (CD) in south India. The median time interval from onset of symptoms to the first diagnosis with UC
was approx. 96 months while with CD it was 12 months [5]. Most patients had aggressive inflammatory disease at presentation which decreased over time with simultaneous increase in penetrating disease whereas structuring disease remained stable. The clinical presentation i.e., chronic diarrhea, blood in stool, anorectal pain and pedal edema were significantly more common in patients with UC in comparison to CD. On the other hand, abdominal pain, perianal fistula, fever and presence abdominal mass were significantly more common in CD compared to UC. UC presents more with extensive disease not paralleled in severity clinically or histologically, follows benign course with easy medical control and low incidence of fulminant disease, cancer, complications, and surgery. Most of the patients had one or more complaints outside the gastrointestinal tract; arthralgia and backache were the most common manifestations in both UC and CD patients.

IBD results from a strong genetic predisposition on which environmental factors act to produce dysregulated gut mucosal immune response to luminal antigens (the intestinal micro biota, normal or abnormal). The genetic findings may predispose, yet the increasing number of IBD cases reported within limited period of time in India cannot be explained totally by genomic changes but provide evidence for the importance of exposure to environmental factors in disease pathogenesis. Childhood infections, lack of breast-feeding, exposure to helminthes, smoking, repeated use of drugs like antibiotics, proton pump inhibitors, dietary and psychological factors have all been implicated in IBD pathogenesis and may act by altering this balance between the gut and micro biota either by themselves or by altering the latter. Interventional studies assessing the effects of modifying these risk factors on natural history and patient outcomes are an important unmet need [3].

METHODS
A search was conducted in December 2018 using PubMed as search engine for studies published between 2012 and 2018 on humans only and focusing on the population based studies showing epidemiology and risk factors for IBD. Key words were used either in single form or in combination and included “IBD and India”, “Inflammatory Bowel Disease and India”, Ulcerative colitis and India” and “Crohn’s disease and India”. Population based studies on adults >18 years including IBD in Indian settings were included whereas those of other diseases are excluded. A secondary search was also done to review the references of the articles included in the final analysis.
RESULTS
The initial search yielded 22 articles which were reduced to 10 after removing duplicates and applying
inclusion and exclusion criteria, including secondary search. 40% (n=4) were published in 2015, 20 % (n=2) were published in 2013, 10 % (n=1) in 2012, 10 % (n=1) in 2016 and 10% (n=1) in 2017.

1. Variable extraction
1.1 Research methods
1.1.1 Study location: - 50% (n=5) of the studies mentioned the exact location of the study. The studies were from IBD clinics of AIIMS, New Delhi, IIPG&R, Kolkata and other studies were from multi-centers including different regions of India. 20% of the studies were systemic review papers including data from different search engines.
1.1.2 Study design: - In this review, 30% (n=3) studies were retrospective cohort studies, whereas 20% (n=2) studies were case control studies and two studies (20%) were systematic review papers.
1.1.3 Study settings: - Most of the studies were clinic-based studies (n=7, 70%) including patients of IBD. Diagnosis of IBD was based on clinical, radiographic and endoscopic factors whereas in one study Lennard-Jones criteria were used [9]. WHO criteria of definite Crohn’s disease was also used in a study [2].
1.1.4 Sample sizes: - Total sample size of IBD patients in 70% (n=7) studies ranged from 43 to 1652.
1.1.5 Sources of data collection: - In most (n=4, 40%) of the studies Performa or questionnaire was used to collect data from IBD patients whereas in other retrospective studies medical records were analyzed to gather information.
1.1.6 Variables assessed: - Several variable categories were gathered based on the literature review of the articles included in the final analysis. These include the following.

1.2 Socio demographic factors
1.2.1 Age: - The commonly studied age was between 20-40 years. 60% (n=6) studies included adults of age more than 18 years whereas 40 % (n=4) studies didn’t specified the age of the participants. In most studies, the peak incidence of IBD is in the second to fourth decade of life and has remained so over several decades.
1.2.2 Gender: - Mostly, 30% (n=3) studies were included participants of both sexes, 10% (n=1) included only females and 60 % (n=6) didn’t specify the gender of their participants. Two studies (20%) shows male preponderance while one study (10%) shows female preponderance for both Ulcerative colitis and Crohn’s disease. One study specified that female gender is more associated with Extra-intestinal manifestations of both Ulcerative colitis and Crohn’s disease.

1.3 Risk factors
1.3.1 Smoking: - 60% (n=6) studies specified the positive association between smoking and occurrence of disease. Studies show an association between smoking and Crohn’s disease whereas smoking cessation, but not current smoking, is associated with increased risk of UC. It was found that the majority of the patients were smokers with males being more prominent.
1.3.2 Alcohol: - Only 10% (n=1) study shows a positive association between alcohol consumption and occurrence of IBD.
1.3.3 Family history: - 30% (n=3) studies specified a definite history of family in IBD patients. One or more family members are suspected to have IBD.
1.3.4 OCPs: - Only 10% (n=1) study shows that consumption of oral contraceptive pills can be a cause of occurrence of IBD.
1.3.5 Compliance from treatment: - Only 10% (n=1) study states compliance from treatment a causative factor for IBD.
1.3.6 Diet: - 20% (n=2) of the study specified that western diet is a risk factor for IBD and vitamin D deficiency has been observed in patients of IBD.
1.3.7 Hygiene: - Two studies showed factors associated with hygiene and risk of IBD. These include urban living, large family size, toilet facilities, helminthes infestation, drinking water facilities etc.
1.4 Disease factors

1.4.1 Disease duration: Studies showed that most patients had aggressive inflammatory disease at presentation which decreases over time with simultaneous increase in penetrating disease. Indian CD patients are diagnosed after an average gap of 1 and ½ years from symptom onset whereas this gap extends to up to 4 years in UC patients [7]. This may result mainly because of diagnostic confusion and lack of awareness among patients.

1.4.2 Clinical presentation: Four studies (40%) mentioned clinical spectrum of Ulcerative colitis and Crohn’s disease. Chronic diarrhea, blood in stool, anorectal pain and pedal edema were significantly more common in patients with Ulcerative colitis in comparison to Crohn’s disease. On the other hand, abdominal pain, perianal fistula, fever and presence of abdominal mass were significantly more common in Crohn’s disease compared to Ulcerative colitis. Disease with intermittent flares or relapses are more common in Crohn’s disease than in Ulcerative colitis, while a pattern of chronic continuous disease is more common in Ulcerative colitis than in Crohn’s disease.

1.4.3 Disease classification: Four studies (n=4, 40%) classified the extent of disease, according to Montreal classification used for disease phenotype which is based on age of onset, disease location and disease behavior wherein the extent is categorized into E1, E2 and E3. In the majority of Ulcerative colitis patient’s disease location was left sided colitis, pan colitis and proctitis whereas in patients with Crohn’s disease most commonly affected part was a colon and ileocolon.

1.4.4 Extra intestinal manifestations: Extra intestinal manifestations are quite common in both Ulcerative colitis and Crohn’s disease patients especially those involving eyes, bones, joints, skin and biliary tract. Extra intestinal manifestations seen in UC and CD can be either immune mediated or occur as a result of severe intestinal inflammation or extensive resection. Studies (N=5, 50%) showed that majority of IBD common were arthralgia (with or without evidence of arthritis), backache and recurrent oral ulcers.

1.4.5 Investigations: The most common investigatory procedures followed by the majority of the studies (n=7, 70%) are colonoscopy, terminal ileum intubation, colonic biopsies and a minority followed barium enema. A variety of procedures were used for small bowel and colon evaluation including barium meal or small bowel enema, CT scan, enteroscopy. In study the diagnosis of Crohn’s disease was confirmed on surgically resected specimens.

1.4.6 Complications: The most common intestinal complications noted among IBD patients in most of the studies are GI bleeding, intestinal obstruction and anemia or occult GI bleed. Penetrating complications such as fistula, abdominal masses, or intra-abdominal abscesses were less common [2].

1.4.7 Treatment received: According to most of the studies, majority of CD patients received treatment with anti-tubercular drugs. Different forms of disease specific treatment received by patients were mentioned, including corticosteroids, aminosalicylates, azathioprine and oral steroids were given. Other immunosuppressant’s such as methotrexate were used in some studies (n=1). Surgical procedures were also done, resection and anastomosis was the most common surgery performed. Colectomy, fistula repair and/or fistulectomy and incision and drainage or peritoneal toileting were the other type of surgery performed.

1.4.8 Follow-up: Only one study did follow-ups of patients for every six months to assess the extra intestinal manifestations of IBD patients.

DISCUSSION
The main findings of this systematic review revealed that age, gender, smoking history, family history, disease duration and extent of disease seems directly associated with the incidence and prevalence of IBD. Presently there is lack of well-designed population based studies from India to authenticate the rise of prevalence of IBD in India and its regional differences. Patients of Ulcerative colitis and Crohn’s disease are keeps on increasing and many cases remain undiagnosed due to diagnostic confusion between UC and CD and with Intestinal Tuberculosis also.
Fortunately, IBD has not yet attained the dimension of a pressing public health problem and hence it is difficult to visualize active participation of government in addressing its problem in near future.

**RATIONALE OF THE STUDY**
This systematic review was done to assess the various factors affecting IBD or involved in the pathogenesis of IBD. Population based studies are in need to find out the preventive measures which patients of both Ulcerative colitis and Crohn’s disease can follow and the disease duration can be reduced to prevent the rising morbidity and mortality of IBD in India.

**CONCLUSION**
This study concludes that various demographic as well social factors are directly associated with the prevalence of Inflammatory Bowel Disease in India and policies need to focus on the most effective diagnosis of the disease to prevent its occurrence.

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Food Safety in Hospitals
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Abstract
Background: In the complex healthcare environment like that of India a very important issue in hospitals is the attention to food safety by the staff of the hospital. India is a tropical country and there is ignorance with respect to food borne illnesses. In general most illnesses caused due to food goes unrecognized. The patients who come to hospitals may be elderly, may have chronic disease or can be immune-compromised due to various reasons. This makes them more vulnerable to diseases that occur due to contaminated food. Methods: The study was conducted by secondary data analysis. Online journals, articles and books were referred for the study. Result: There was a general observation of lack of knowledge about causative agent associated with food borne diseases by the hospital staff. The main issue faced is training and compliance to policies (of the staff) with respect to food safety. Conclusion: In the hospitals there has to be proper management of food to decrease food safety related issues. To reduce the damage of diseases from contaminated food the hospital need to emphasize on the food safety by training of the staff and compliance to policies related to food safety.

Keywords: Food safety, Hazard Analysis and Critical Control Points (HACCP) system, food safety programmes, contaminated food, food borne diseases

INTRODUCTION
The main aim of a food provider of any hospital is to serve meal that fulfills all the nutritional requirements of the patient, gives satisfaction to the patient and is free from harm causing pathogens. Food hygiene in hospitals plays a very crucial part in patient health and recovery. According to WHO, every year more than two million people die from intestinal diseases, most of the deaths are due to eating infected food from the caterers. High rate of morbidity and mortality is caused due to contaminated food. In hospitals mishappening is mainly due to improper handling of food by workers, touching the food with bare-hands, improper hand washing, improper cleaning of kitchen and contaminated utensils and non-implementation of Hazard Analysis and Critical Control Points (HACCP) system. HACCP is a food safety system that helps identify foods and procedures that are most likely to cause foodborne diseases. While many developed and developing countries have food standards prescribed for hospitals, the implementation of the same is not done.
Food hazard caused can be biological (bacteria, virus, mould and yeast); chemical (cleaning chemicals, non-permitted food additives); physical (bits of shell or bone, plaster, broken glass, string) and Allergenic (nuts, dairy products).

According to Adikari et al.(2016) food contamination can occur anytime during food preparation that is from the uncooked food or from the prepared food material. This makes it imperative to closely observe correct meal safety and protection practices when making the food or serving it.

Contemporary research defines the urgency of educating and training the caterers on danger of contaminated food, refrigerator temperature control and individual sanitation. All the workforce should be given proper training on food hygiene to implement positive outlook and change the practice of food handling. There is a need of evaluation of effect of food hygiene on patients, but no accurate data of epidemiological studies exists concerning the trouble of food borne diseases. In the developing countries the epidemiological data on food borne diseases is very less.

This is because that even if there is an outbreak than the event is not recognized, not reported or investigated only when it becomes a serious public health issue.

It is very complex to do the estimation of global or local burden of food borne disease. This is due to the fact that food borne diseases are communicated by a number of routes like water, soil or air.

The elderly, pregnant women, child and infants, patients with weak immune system and chronic diseases are at the higher risk group of food borne diseases. The patients who are more susceptible to microbial agents seeks specific issues in hospitals. Moreover, the risk increases when the caterers and the staffs are not particularly skilled about food safety and HACCP.

**EXPERIMENTAL**

The study is a purely descriptive study based on the secondary data analysis of online journals, articles and books with a primary objective of determining the food safety in hospitals and the adherence to Hazard Analysis and Critical Control Points (HACCP). The study gives the data collected from the previous research in this field (done globally) on hospital food safety.

**RESULT AND DISCUSSION**

There was a general observation of lack of knowledge about causative agents and food vehicles associated with food borne diseases and proper storage temperature of hot and cold ready to eat foods across hospitals across the world.

There was a widespread positive outlook towards temperature control and using gloves during handling food. Academic programs on food sanitation are not attended by 80% of the responsive nurses. It is shown by the studies that the nurses who attended the training program at least once manage appreciably better about some awareness concern, but there was no observed difference in in the behaviour and practice unit.

The study also indicates that the experienced staffs had more positive outlook and better practices while the younger staffs are more aware of using gloves while handling the unwrapped raw or cooked food. Males lead in the habit of maintaining hygiene leaving behind the females in the hygiene practices.
was also revealed through studies that in the hospitals with less than 300 beds the staff has better hygiene practices.

A change is noticed in the practice and outlook on hand-washing habit when the staff of the hospitals were given health education and training on personal hygiene. The studies (across countries) also showed the trainings affected the staff of the hospitals and the cases of food borne infections caused in hospitals due to improper maintenance of food hygiene reduced greatly as compared to previous cases. Also the awareness created by the hospitals and the government through mass-media among the patients helped in decreasing the food borne diseases in hospitals.

The knowledge of the hazards of advanced food preparation and reheating the food before serving, implementation of sanitation practices, awareness of preventive impact of wearing gloves was seen high in the hospitals of U.S.

In the hospitals that have followed a food-hygiene routine manual under the HACCP system for storage of food, individual sanitation, the staff are more aware of the five leading pathogens of foodborne diseases. The implementation of HACCP system is not taken into concern by most of the hospitals even though it helps in avoiding foodborne illness. The barriers in implementation of the HACCP system in hospitals are lack of awareness and huge expense which the hospital refuses to take over. There is a general need to implement the HACCP system, right from the suppliers to the hospital administration. Murat et al. (2007) from his studies revealed the main issue in application of HACCP system and other food safety programs is the lack of awareness. In a research in Greece, Georgia and Babatsikou (2010) showed that some of the issues in exercise of HACCP system are as follows - the management abstain from the responsibility, lesser investment in food safety, insufficient supplies, inadequate training programs for health directors and unreal opinion about HACCP norms.

Globally it was observed that the knowledge of health workers with respect to food safety is not adequate, therefore there should be greater emphasis on education of hospital staff on food safety and food handling. The same can be done by organizing training programs for the staff for good food safety practices and educating staff on the basics of food safety. This will thus ensure that the overall knowledge of the staff increases with respect to food safety. At the same time the staff should be given adequate supply of gloves, masks with respect to food preparation and handling.

**CONCLUSION**

In order to restrain the foodborne illness in hospitals proper emphasis must be on the dietary department. The implementation of HACCP method in the hospitals will lead to safe and healthy food preparation, will increase patient satisfaction and thus decrease foodborne illnesses cases. HACCP standards must be implemented in the hospitals with proper principles to be followed by the nutrition unit of the hospital. The workforce must be provided effective and ongoing training and education to make them aware of the system and its positive effects and food hygiene assurance.

The need of the hour is to educate the workforce and increase awareness among them concerning the process of food handling. Both safety and quality of food should be taken into concern.
The supervision and strict evaluation of food provided and the food providers with the monitoring of the kitchen and the equipment used in preparing food is essential.

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Role of microwave radiation in green synthesis of silver nanoparticles
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Abstract

Background: Literature revealed that the green (biological) synthesis of silver nanoparticles is a simple, cost effective, environmental friendly and high yield producing method. It is a biological product mediated synthesis of nanoparticles like microbes, macro and micro molecules, plants etc. Microwave irradiation is emerging as a rapid and environment friendly mode of heating for the formation of silver nanoparticles. It is rapid, continuous and constant heating of solvent, reagent and intermediates that provides uniform nucleation and growth condition for the large scale production of nanoparticles because of rapid synthesis, small size nanoparticles (10-20 nm range) and high yield of production. Objective and method: The objective of this review is to explore the role, use and benefit of microwave radiation in biological synthesis of silver nanoparticles for their various uses. The literature from various scientific data bases such as pubmed, sciedirect, CAS was reviewed to achieve the objective. Conclusion: The review concludes that the microwave radiation plays a very important role in rapid, uniform and small size synthesis of biological silver nanoparticles. By using microwave radiation nanoparticles are synthesized within a minute which is also ecofriendly.

Key words: Cost effective, Rapid synthesis, Eco-friendly, Green synthesis, Microwave radiation, Silver nanoparticles,

INTRODUCTION
Silver nanoparticles are nano sized formulation synthesized by using silver nitrate (AgNO₃) as a major component. The range of silver nanoparticles, from 1 nm to 100 nm and also constructed in numerous shapes depending on the application of process. Silver nanoparticles assume imperative job in nano-science and nanotechnology, especially in nanomedication [2]. Silver nanoparticles are progressively utilized in different fields, including therapeutic, sustenance, medicinal services, consumer, and modern purposes, because of their interesting physical and concoction properties. The method of synthesis of silver nanoparticles is cost effective, simple and ecologically well disposed and creates high yield [3]. Green synthesis of silver nanoparticles is a plant interceded combination of nanoparticles which incorporate the leaf, organic product, stem, bark, root, seeds remove, phytoconstituents and fundamental oils. Green silver nanoparticles could possess better pharmacological activity by keeping action of both silver nanoparticle itself as well as of the extract. Green silver nanoparticles can also be used as antimicrobials, anticancers, antidiabetic agents. Microwave assisted preparation utilizing biomaterials
as both lessening and topping specialists is an achievable path for the fast and simple green synthesis of AgNPs. It gives a few attractive highlights, for example, shorter response time, lower vitality utilization and better product yield. Microwave heating offers fast and uniform warming of the response medium and in this way gives uniform nucleation and development conditions for nanoparticles. [4].

**Rationale for the biological (green) synthesis of silver nanoparticles**

- Due to the development of resistance to antimicrobials we need some specific antimicrobials which not only cure the disease but also nontoxic to the body and cost effective.
- The green synthesis of silver nanoparticles is new approach in this concern, as it consist of plant extract as well as the silver nanoparticles and thus could possess the better/synergistic antimicrobial effect.

**Role of microwave radiation in synthesis of nanoparticles**

Microwave radiations are the waves with frequency range of 0.3 to 3 GHz. They can be used in the green synthesis of silver nanoparticles. The heating of the reaction mixture occurs due to the energy produced by the oscillation of the ions of solvent molecules. The To and Fro movement of solvent molecules was due to conduction of solvent ions and dipole rotation under the influence of electric and magnetic field. Further the heating of solvent depends upon the dielectric constant of the solvent and material of container. Also the efficient heating of the reaction mixture/solution depends upon the dissipation factor (tan δ) [1].

The tan δ can be calculated as follows:

\[
\text{Tan}\delta = \frac{\varepsilon''}{\varepsilon'}
\]

Where \(\varepsilon''\) indicates the dielectric loss and \(\varepsilon'\) is dielectric constant.

Diagram representing the green synthesis of silver nanoparticles using microwave radiation
### Review on microwave synthesis of nanoparticles

<table>
<thead>
<tr>
<th>S.No</th>
<th>Natural source</th>
<th>Part used</th>
<th>Condition for synthesis</th>
<th>Application</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><em>Streptomyces coelicolor</em> <em>Streptomyces coelicolor</em> Pigment</td>
<td>Frequency: 2.45GHz Time: 90 sec</td>
<td>Industrial use</td>
<td>[7]</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><em>Alpinia galanga</em> Rhizome</td>
<td>Power:800 W frequency: 2450 MHz Time: 90 sec</td>
<td>Antimicrobial</td>
<td>[8]</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><em>Fraxinus excelsior</em> Leaf</td>
<td>Frequency: 2.45 GHz Time: 2 min</td>
<td>Antioxidant</td>
<td>[9]</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><em>Origanum majorana &amp; Citrus sinensis</em> Leaf</td>
<td>Frequency: 2.45GHz Time: 60 sec</td>
<td>Antibacterial</td>
<td>[10]</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td><em>Gum kondagogu</em> Gum</td>
<td>Power:750 W frequency: 2450 MHz Time: 90 sec</td>
<td>antibacterial and antioxidant</td>
<td>[12]</td>
<td></td>
</tr>
</tbody>
</table>
Advantages of the application of microwave energy in green synthesis of silver nanoparticles

Microwave radiation vitality has show to be an exceedingly powerful warming source in inorganic nanoparticles synthesis. It has following favorable advantages:

- Proficient wellspring of warming which prompts expanded rates of response and encourage quicker synthesis;
- Selective warming depends on the rule that distinctive materials react differently to microwaves;
- Shape and size control by effectively tuning instrumental or response parameters;
- Possible mixes of microwave warming science with other settled fluid stage amalgamation courses like solvothermal, sonochemical techniques.
- Greater reproducibility of substance responses than in ordinary warming, inferable from uniform warming and better control of procedure parameters [5].

Limitations of microwave energy in formulation of silver nanoparticles

Then again there are a few restrictions of microwave radiations are:

- Well being and health related risks identified with the utilization of microwave-warming contraption
- Its absence of adaptability
- Restricted relevance [5]

CONCLUSION

The review showed that the microwave radiation plays a very important role in fast/rapid, uniform and nano size synthesis of green silver nanoparticles. Microwave radiation heating can synthesize nanoparticles within a minute which is also ecofriendly and cost effective. The reason for the use of microwave radiation energy has mainly been to design faster, graceful, clean and economically more viable method for synthesis of nanoparticles. Since the early days of microwave synthesis, the observed reaction rate acceleration and, sometimes, altered product distribution, compared to those achieved in oil-bath experiments, have led to speculation on the existence of so-called “specific” or “non-thermal” MW effects 51,52. Historically, such effects were invoked when the outcome of a synthesis performed under MW conditions was remarkably different from that achieved for the conventionally heated counterpart at the same nominal temperature.
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Swiss Ball Activities to Improve Trunk Control in Post-Stroke Patients
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Abstract

Introduction: Activities on the swiss ball allow variable platform with a narrow base of support engaging many trunk muscles together, further improving pelvic movement and balance. The present study aims to analyze the effect of Swiss ball activities on trunk control in post-stroke patients. Materials and Methods: 30 post- stroke participants in the age group of 35 to 60 were randomly assigned in two groups. The experimental group (Group A) received conventional physiotherapy along with Swiss ball activities and the control group (Group B) received only conventional physiotherapy, 4 times per week for 3 weeks. Trunk impairment scale (TIS) was used to evaluate the trunk control. Results: The mean difference of TIS score of Group A was 4.30 (p<0.05) and Group B was 2.87 (p<0.05). The mean difference of post intervention TIS score of Group A and Group B was 1.36 (p<0.05). Conclusion: Swiss ball activities are more effective than exercises done on the plinth in improving the trunk control.

Keywords: Swiss Ball, Stroke, Trunk Control, Trunk Exercises, Trunk Impairment Scale.

INTRODUCTION

Stroke is the most common cause of morbidity around the world, mainly affecting elderly population. But nowadays, middle aged people are also getting affected because of the lifestyle and work load. The seriousness of a stroke relies upon the area and size of the deterrent which harms cerebrum tissues. As of the definition of Hemiplegia half of the side gets affected opposite to the lesion. This will results in weakness of trunk muscles due to paralysis or nonuse of affected side.

Trunk plays a vital role to keep the body erect and gives base to the pelvis and spinal cord [1,2]. The trunk act as a fulcrum which provide degree of freedom for distal limb movement, control, balance and functional activities [3]. However, stroke patients lose control on balance [4,5,6] and posture [7,8] due to the weakness of trunk and reduced proprioception. In addition, postural sway increases in the sitting position[9], and subject unable to shift weight on either side [10].

Post stroke, due to incorrect posture, patient’s ability to coordinate functional activities reduces which affects the prognosis [11, 12]. They lack coordinated movement control which changes the order of muscle movement. These patients then move their limbs in unusual pattern to complete the action which results in much wastage of energy. After stroke, asymmetric weight distribution in sitting position with
broad base of support and decreased degree of freedom, due to sensory-motor impairment of trunk, and is more likely to have early compensation [13].

Contrary to common belief that only one side is involved in stroke, trunk muscles are affected bilaterally because of the bilateral innervation [14, 15]. Earlier studies reported the impairment of trunk flexors, extensors and trunk rotators of both sides which is measured by isokinetic dynamometer, when compared to the same aged healthy population [16]. Transcranial magnetic stimulation and electrical stimulation studies have revealed that the trunk muscles are innervated by fibers from both brain hemispheres [17, 18]. According to one of the recent studies on trunk control, it has been identified that trunk control is an important way out to predict the functional outcome post-stroke [19, 20].

Most researches and clinical practice of rehabilitation post-stroke target on more affected extremities without giving much attention to trunk control. Unlike upper and lower limb muscles, abdominals need pelvis, thorax and central aponeurosis as a stable base, depending upon the part of trunk which is moving. Counter-rotation between the upper and lower trunk, requires contraction of opposite side muscles work on the concept of mobility over stability. This movement is essential for all the functional movements in our daily activities. The rotation of the trunk allows the shortening of antagonist which draws the pelvis and thorax forwards. In addition the trunk rotators cannot work efficiently when there is approximation of origin and insertion when there is side flexion of spine. A recent study on dynamic post-urographic analysis suggested that movement of trunk in post-stroke are executed mainly by upper trunk with reduced anterior tilting of pelvis which implies impairment of mobility over stability skills of the trunk [21].

Therefore trunk muscle exercises are indeed important and should be the part of rehabilitation in post-stroke patients. A randomized trial that added 10 hours additional trunk exercises to regular rehabilitation had a beneficial effect in improving trunk control, particularly the dynamic sitting postural control [22]. In turn better trunk control improves the pelvic movement, balance and reduces the risk of fall.

An unstable surface, Swiss ball plays an important role in strengthening the trunk muscles by recruiting many muscles together without increasing the total load. An unstable surface increases activation of the rectus abdominis and increases degree of freedom per exercise when compared to a stable surface [23]. Although many physiotherapists working with post-stroke patients focus on improving their postural control and balance using Swiss ball, but there are very few studies found, which emphasize specifically on trunk control with Swiss ball. Most of the studies have been done in acute phase. Therefore, we conducted the research to find out the effect of Swiss ball activities on trunk control in sub-acute phase (4 weeks – 12 weeks). This is the best phase to get the maximum recovery and gives the opportunity to reach the highest level [24].
There are evidences of significant improvement in core muscle strength with Swiss ball activities in normal individuals so the same may be applied for post-stroke patients to train their trunk muscles. Trunk muscles are innervated by fibers from both the hemispheres, like the facial muscles so because of the intact ipsilateral innervation they are trainable muscles. The trunk muscles recovery was mediated by the unaffected hemisphere and probably by a compensatory activation of preexisting uncrossed pathways rather than cortical reorganization, unlike extremities [25]. The aim of the study is to study the effect of Swiss ball activities on trunk control in post-stroke patients. We hypothesized that there is a significant effect of Swiss ball activities on trunk control as measured by trunk impairment scale in post-stroke patients.

SUBJECTS AND METHODOLOGY
An experimental pre-test-post-test study design was conducted in neurological rehabilitation center of Jain Hospital, Karkadooma, Delhi. Study protocol was approved by the ethics and scientific committee of the institution. 30 patients diagnosed with stroke within the age group of 40-65 years of both genders participated in the intervention were recruited from the Neuro-physiotherapy department, Jain Hospital. Stroke subjects were included if they met following criteria: 1) Post stroke patients up to 3 months 2) First onset of unilateral lesion 3)Ischemic or hemorrhagic stroke 4)Medically stable 5)Able to understand and follow simple verbal instruction, scoring at least 24 on MMSE 6) Can sit unsupported for 1 minute on a stable surface with feet touching the ground 7) Scoring more than 13 on PASS(TC) 8) Scoring more than 8 on TIS. Patients were excluded if they had 1) Neurological disease and Musculoskeletal disorders affecting trunk control other than stroke 2) History of surgery due to musculoskeletal diseases affecting motor control

Thirty patients meeting inclusion and exclusion criteria were invited for the study. Physiotherapy assessment of the selected 30 patients was performed. The study intention was explained to all the participants and they were requested to sign the written informed consent.
30 Hemiparetic post stroke patients for this study were recruited from physiotherapy department of JNH.

The purpose of the study was explained to the subjects.

The written consent was obtained from all the patients recruited in the study.

Physiotherapy assessment of the patients was performed.

PASS and TIS score were used to measure trunk control in patients with stroke.

Patients were divided in Experimental Group (Group A) and Control Group (Group B).

Group A received conventional physiotherapy along with Swiss ball protocol
Group received only conventional physiotherapy for 4 sessions per week for 3 weeks

Initially the practice trial was provided on Swiss ball and the exercise protocol started from the next day for 20 minutes, initiated with mild to no assistance

PASS-TC and tis score was taken at 2 weeks and 3 weeks post intervention

Flow Chart 1: Flow Chart of the Procedure
Flow Chart 2: Flow Chart of the Participants

Assessed for eligibility (n=48)

Excluded (n=18)
- MMSE < 24
- Multiple Stroke
- Stroke + Parkinson disease
- Severe Osteo-arthritis
- PASS score <13

Included (n = 30)

Experimental Group A (n=15)
- Drop out (n=2)
  2 Subjects discontinued after a week
- Completed exercises protocol on Swiss ball (n=13)

Control Group B (n = 15)
- Drop out (n=0)
- Completed Conventional physiotherapy protocol (n=15)

Data Analysis
### Table 1: Swiss Ball Exercises

<table>
<thead>
<tr>
<th>POSITION</th>
<th>SWISS BALL EXERCISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine</td>
<td>1. Bridging</td>
</tr>
<tr>
<td></td>
<td>2. Unilateral Bridging</td>
</tr>
<tr>
<td></td>
<td>3. Lower Trunk Rotation</td>
</tr>
<tr>
<td>Sitting</td>
<td>1. Static Sitting balance</td>
</tr>
<tr>
<td></td>
<td>2. Trunk Flexion – Extension</td>
</tr>
<tr>
<td></td>
<td>3. Trunk Lateral Flexion</td>
</tr>
<tr>
<td></td>
<td>4. Trunk Rotators</td>
</tr>
<tr>
<td></td>
<td>• Upper Trunk</td>
</tr>
<tr>
<td></td>
<td>• Lower Trunk</td>
</tr>
<tr>
<td></td>
<td>5. Weight Shifts</td>
</tr>
<tr>
<td></td>
<td>6. Forward Reach</td>
</tr>
<tr>
<td></td>
<td>7. Lateral Reach</td>
</tr>
</tbody>
</table>

Exercises are gradually introduced, and the number of repetitions was determined on the basis of earlier pilot study. Exercises are performed with adequate rest periods in between.
DATA ANALYSIS

Statistical analysis was done for within and between the group analysis. Windows Excel 2007 was used to analyze in this study. Paired t-test was used for within the group analysis. Unpaired t-test was used for inter-group analysis.

RESULTS

Thirty subjects were allocated for the study, 15 were included in experimental group and 15 in control group. There was 2 drop outs from the experimental group. The characteristics of experimental and control groups are shown in Table 5.1, no significant differences between the groups were found for
the demographic variables, “p values” for age (0.178), gender (0.723), affected side right/left (0.716). Stroke related parameters and outcome measures are shown in Table 5.2 at the pre-intervention level and there were no significant differences between the groups, “p values” for TIS (0.717) PASS (1.0) and MMSC (0.481).

The difference between the baseline characteristics of the participants belonging to both groups was not statistically significant. Post intervention, both the groups improved on trunk control but the experimental group (Group A) improved more significantly than the control group (Group B). The mean difference of pre and post intervention in TIS score of Group A was 4.30 and Group B was 2.87 which is significant (p<0.05) in both the groups. The mean difference of post intervention TIS score of Group A and Group B was 1.36 with p value <0.05, which is significant.

<table>
<thead>
<tr>
<th>GROUP ITEM</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>‘p’value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A (N=15)</td>
<td>Group B (N=15)</td>
<td></td>
</tr>
<tr>
<td>AGE, Mean</td>
<td>55.7 (±12.48)</td>
<td>52.3(±14.61)</td>
<td>0.178</td>
</tr>
<tr>
<td>GENDER, Male/Female</td>
<td>8(54%)/7(46%)</td>
<td>9(60%)/6(40%)</td>
<td>0.723</td>
</tr>
<tr>
<td>AFFECTED SIDE, Right/Left</td>
<td>5(33%)/10(67%)</td>
<td>6(40%)/9(60%)</td>
<td>0.716</td>
</tr>
</tbody>
</table>

Table 2: Table showing normal demographic details of the subjects

<table>
<thead>
<tr>
<th>GROUP ITEM</th>
<th>Experimental group</th>
<th>Control group</th>
<th>“p value”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GROUP A (N=15)</td>
<td>GROUP B (N=15)</td>
<td></td>
</tr>
<tr>
<td>Trunk Impairment Scale (0-23)</td>
<td>17.47(±0.57)</td>
<td>17.53(±0.52)</td>
<td>0.717</td>
</tr>
<tr>
<td>PASS(TC)</td>
<td>14.33(±0.81)</td>
<td>14.33(±0.72)</td>
<td>1.0</td>
</tr>
<tr>
<td>MMSE</td>
<td>27.33(±2.58)</td>
<td>28(±2.54)</td>
<td>0.481</td>
</tr>
</tbody>
</table>

Table 3: Table showing pre-intervention assessment scales
Table 4: Table showing pre and post intervention scores of TIS

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre</th>
<th>Post</th>
<th>Mean Value</th>
<th>Standard Deviation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.47(±0.51)</td>
<td>21.76(±0.72)</td>
<td>4.30</td>
<td>2.17</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>B</td>
<td>17.53(±0.52)</td>
<td>20.40(±0.63)</td>
<td>2.87</td>
<td>2.14</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>A&amp;B</td>
<td>0.06</td>
<td>2.06</td>
<td>p&gt;0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.36</td>
<td>2.06</td>
<td>P&lt;0.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph 1: Graph showing Pre-intervention mean value of TIS, PASS and MMSE for Group A and Group B

Graph 2: Graph showing Pre and Post intervention Mean Value and standard deviation of TIS for Group A and Group B
DISCUSSION

The study which aimed at improving the trunk control by performing activities on the Swiss ball showed significant improvements in both groups in pre and post interventions, but experimental group gave better result than control group. The possible reason for better results may be due to the postural perturbation provided to patient on Swiss ball reacted to which muscles of trunk contract in order to achieve the desired postural stability. Lumbo-sacral, erector spine as well as deep abdominal stabilizers are more involve during exercises on an unstable base. An Optimal control of good posture is necessity for daily activities as well as for the prevention of injuries. Stabilization of posture is got by motor and sensory neurons of the somatosensory system, by getting feedback from visual, vestibular and somatosensory. The vestibular system is the main control system for erect posture. If there is any disturbances in sensory (processed in brainstem and cerebellum) or motor feedback loop which happens in stroke, result in increased body sway and muscle activity. The main role of a CNS is to coordinate the focal movement and helps to achieve the goal of a given task. Postural adjustment plays an important role in performing task by maintaining proper balance. When we move we are not aware of neuromuscular processes which controls our posture automatically. So, whenever there is any disturbance in either of the pathways, it will imply incorrect posture adjustment during movement.

The study results had shown that trunk exercises performed on a Swiss ball resulted in a greater improvement in lateral flexion, lateral reach and symmetrical rotation as measured by dynamic sitting balance and the coordination subscales of TIS. The overall effect size index (1.36) observed in the study is in favor of the experimental group, Swiss ball provide a challenging environment with more degree of freedom than stable surface during task specific trunk exercises.

An interesting finding was the improvement in trunk rotation in experimental group as measured by coordination subscale of TIS. Coordination of the trunk is the mobility over stability task which require counter-rotation of upper and lower trunk. During the study we found that the subjects were able to rotate the upper trunk but had difficulty in rotating the lower trunk. During the rotation of upper trunk subjects were asked not to move the feet away from the ball and thighs and legs should be in contact with the ball. This engages the whole trunk in order to keep the back straight and maintaining 90-90 position of knees and ankle.

Clinically it was found that there was asymmetrical weight distribution on both feet while sitting on the stable surface. Contrary weight distribution on both feet while sitting on the Swiss ball is better, patient tried to take weight on the affected side in order to maintain the erect posture. During the reaching activities subjects instructed not to take step forward or sideways.

CONCLUSION
This experimental study was done to analyze the effect of Swiss ball on trunk control in post-stroke patients. The result showed significant improvement in both the groups but experimental group (Group A) showed more improvement than the control group (Group B). Hence, the study fails to reject the null hypothesis i.e. there is no significant effect of Swiss ball activities on trunk control as measured by trunk impairment scale in post-stroke patients and accepting the alternate hypothesis i.e. there is a significant effect of Swiss ball activities on trunk control as measured by trunk impairment scale in post-stroke patients.

**LIMITATIONS**

There was a lack of long term follow up of patients to find out the carry over effects of the interventions.

**REFERENCES**


23. Kyoung-Sim Jung, phd, PT, Hwi-Young Cho, phd, PT, and Tae-Sung In, phd, PT Trunk exercises performed on an unstable surface improve trunk muscle activation, postural control, and gait speed in patients with stroke, *Journal List >J Phys Ther Sci>28(3); 2016 Mar >PMC4842470*


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Study of 1, 8-Diamino - 2, 4, 5, 7 - tetrachloroanthraquinone and its derivatives on Oncogenic Y220C Mutant

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Abstract
In human cancer the most frequent genetic alteration is the mutation of tumor suppressor p53. It is an essential mediator of cellular response to oncogenic stresses. The tumor suppressor protein p53 is a transcription factor that plays important role in the prevention of cancer development. The p53 cancer mutation Y220C induces formation of a cavity on the protein's surface that can accommodate stabilizing small molecules.

With a presumption that binding of small molecule targeted to the mutational cavity will stabilize the protein we have performed molecular docking study using Lamarckian Genetic Algorithm to study the binding of p53 cancer mutation Y220C with derivatives of 1,8-Diamino-2,4,5,7-tetrachloroanthraquinone.

The study involved virtual screening of 1400 molecules on the basis of structure similarity of 1,8-Diamino-2,4,5,7-tetrachloroanthraquinone. Molecular docking using Lamarckian Genetic Algorithm was carried out for these ligands and the result gave binding energies which were in the range of -10.53 kcal/mol to -1.17 kcal/mol. The top molecules were selected on the basis of minimum binding energy and protein-ligand complex was created. The complexes were then studied for H-bond interactions which resulted in finding intricate atomic scale properties between ligands and residues Pro151, Val147 and Asp148. The top molecules then were run for in-silico ADMET and druglikeness properties in which we got promising results. Further in-vitro and in-vivo study is required on these molecules as the binding mode provided hints for the design of new Y220C stability drugs which could prevent the mutation of tumor suppressor p53.

Keywords: Y220C, molecular docking, virtual screening, Lamarckian Genetic Algorithm, Cancer drug discovery.

Introduction
P53 (also known as protein 53 or tumor protein 53), is a tumor suppressor protein that in humans is encoded by the TP53 gene. The name is due to its molecular mass: it is in the 53 kilodalton fraction of cell proteins. P53 is important in multicellular organisms. In those organisms it functions as cell cycle regulator and as a tumor suppressor that participates in preventing cancer. The gene is located on 17th chromosome. Mutation results in inactivation of this p53 tumor suppressor protein that further results in 50% cancer in humans. phiKan083 i.e. a carbazole derivative capable of binding with the cavity of protein. In normal human cells, the p53 protein level is very low. When the DNA of the body get
stressed or damaged the p53 is activated and gets triggered, which have major functions as growth arrest, DNA repair and apoptosis (cell death). The growth arrest due to activation of p53 activation stops the division and progression of cell cycle, preventing replication of damaged DNA. During the growth arrest, p53 may activate the transcription of proteins involved in DNA repair. Apoptosis is the last phase to avoid proliferation of cells containing abnormal DNA. Mutation results in many changes in the body one of the main change that leads to cancer is the inactivation of this p53 tumor suppression. Y220C is the most commonly found cancerous mutation, due to this mutation p53 get destabilized. This mutation causes surface cavity which denatures the p53. After binding, it decreases down its thermal denaturation rate[1] The ligands used for the docking are assumed to stabilize the p53 molecule

Figure1. A 3D structure cartoon representation of the crystal protein 1,8-Diamino-2,4,5,7tetrachloroanthraquinone (PDB ID: 2X0W).

Experimental
Ligand generation:
2D structural derivative of 1, 8- Diamino - 2, 4, 5, 7 - tetrachloroanthraquinone on oncogenic Y220C Mutant was searched on PubChem. Derivatives were chosen and drawn. ChemSketch was used for sketching and generating MDL\Mol v2000 molecules with coordinates. The ligands were converted into Protein Data bank (PDB) formats using Open Babel.

Target protein selection/enzyme preparation:
Structure of the p53 core domain mutant Y220C scaffold with PDB ID 2X0W was taken as a protein. To study the binding mode of ligand the active site of protein has to be found out and it was done using software online/offline. Combining a novel algorithm for rapid binding site identification and evaluation with easyto-use property visualization tools, the software will give an efficient means to find and better exploit the characteristics of ligand binding sites.

The protein was optimized by the removal of X0W coordinates and the protein was left with Zn heteroatoms. After removal of attached ligands, energy minimization was performed by standard optimization parameter of Swiss PDB Viewer.[2] The amino acid Val 147 was the active site chosen for docking.[3]

Docking setup:
Docking was performed using Autodock 4.0, which combines energy evaluation through grids of affinity potential employing various search algorithms to find the suitable binding position for a ligand on a given protein.[4] During docking polar hydrogen were added to the ligands using the Autodock hydrogen module and Kollman united atom partial charges were also assigned. A standard docking procedure was used. For each ligands 10 independent docking runs were carried out and
results were collected according to the 1.0 Å rmsd. The docked protein was visualized using UCSF chimera within a region of 5 Å.[5]

Figure 2. Chemical structures of the top ten molecules chosen as best docked.

Table 1. Chemical properties of the top ten chosen compounds as best docked.

<table>
<thead>
<tr>
<th>Serial no</th>
<th>PubChem CID</th>
<th>Compounds IUPAC name</th>
<th>Mol Formula</th>
<th>Properties Mol wt (g/mol)</th>
<th>Log p</th>
<th>H bond donor</th>
<th>H bond acceptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10540087</td>
<td>1,8-Dihydroxy-2,3-dihydropyrene</td>
<td>C14H12O4</td>
<td>200.279</td>
<td>4.5</td>
<td>2</td>
<td>4</td>
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<tr>
<td>2</td>
<td>10755322</td>
<td>2-Methyl-1,8-dihydroxy-1,8-anthraquinone</td>
<td>C18H14O3</td>
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<td>3</td>
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<td>1-Hydroxy-2-(2-hydroxy)antraquinone-9,10-dione</td>
<td>C18H16O3</td>
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<td>4</td>
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<td>4,5-Dimethyl-2,3-brom-1,8-dihydroxyanthraquinone</td>
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<td>9</td>
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<td>C15H7ClO5</td>
<td>373.566</td>
<td>4.6</td>
<td>3</td>
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</tr>
</tbody>
</table>

Results:

Figure 1. Shows 3D of crystal structure of protein 2X0W acquired from RCSB. Figure 2. Shows chemical structures of ten chosen molecules with the least minimum docking energy best drug likeness and LD-50 scores. All chemical properties of the ten chosen molecules are shown in Table 1. Figure 3 shows docking interaction of the top ten chosen compounds. Table 2 report ten molecules using virtual screening and molecular docking against 2X0W Val 147 with maximum of 2-hydrogen bonding to the concern active site.

All agreed to Lipinsk’s rule of 5 of which 2 have high AMES probability, 7 have moderate and 1 have borderline (low). Their LD50 ranged from 5000 to 10000.
Figure 3: Docking interaction of the top ten chosen compounds with protein 2X0W - Val147 showing H bonding with the protein within 5 Å.
Results & Discussion:
Docking was carried out for P53- Y220C with 1, 8- Diamino - 2, 4, 5, 7 – tetrachloroanthraquinone and its 120 derivatives. The result it showed a minimum binding energy of -9.72kcal/mol. Docking was done for 120 molecules with active site VAL 147 for all the compounds. The docking result of the study of 120 ligands demonstrated that the binding energies were in the range of -10.53 kcal/mol to -6.38 kcal/mol. Top 40 molecules, which showed least binding energies, were analyzed by USC chimera and out of 40, ten showed maximum of 2 hydrogen bonds with the active site. Ligands showing hydrogen bond were further analyzed for the Lipinski’s rule of 5 parameter and none of them violated. Molecules showing hydrogen bond with the active site were subjected to molecular properties and drug likeness scores. LD50 was determined by using PROTOX, server. It is a web server for prediction of oral toxicities of small molecules in rodents. The LD50 is the median lethal dose meaning the dose at which 50% of test subjects die upon exposure to a compound. LD-50 ranged from 5000 to 10000 and the 10 molecules thus may cause if swallowed of class 5 except 1 with class 6 which is nontoxic. Toxicity classes are defined according to the globally harmonized system of classification of labeling of chemicals (GHS):[7]
(1) Class I: fatal if swallowed (LD50 ≤ 5 mg/kg);
(2) Class II: fatal if swallowed (5 < LD50 ≤ 50 mg/kg)
(3) Class III: toxic if swallowed (50 < LD50 ≤ 300 mg/kg)
(4) Class IV: harmful if swallowed (300 < LD50 ≤ 2000 mg/kg)
(5) Class V: may be harmful if swallowed (2000 < LD50 ≤ 5000 mg/kg)
(6) Class VI: non-toxic (LD50 > 5000 mg/kg)
All molecules were also subjected to drug likeness, Absorption, distribution, metabolism and elimination (ADME) using the Molsoft (http://molsoft.com/mprop/) and (http://ilab.acdlabs.com/ilab2/) websites. More experimentation is mandatory in order to test these compounds in vitro.

<table>
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<tr>
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<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Drug likeness score</td>
<td>-0.03</td>
<td>0.51</td>
<td>0.68</td>
<td>-0.13</td>
<td>0.23</td>
<td>-0.61</td>
<td>0.03</td>
<td>0.21</td>
<td>-0.23</td>
<td>-0.48</td>
</tr>
<tr>
<td>Probability of +AMES</td>
<td>0.94</td>
<td>0.65</td>
<td>0.86</td>
<td>0.98</td>
<td>0.95</td>
<td>0.95</td>
<td>0.94</td>
<td>0.93</td>
<td>0.89</td>
<td>0.7</td>
</tr>
<tr>
<td>Maximum passive absorption</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>LD50(mg/kg)</td>
<td>5000</td>
<td>5000</td>
<td>7000</td>
<td>10000</td>
<td>5000</td>
<td>7000</td>
<td>7000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
</tbody>
</table>
Table 2. The overall properties of the top ten chosen compounds from virtual screening drug likeness score and ADMET studies

<table>
<thead>
<tr>
<th>Toxicity class</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>6</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
</table>

Conclusion:
Based on the molecular docking and ADMET studies of 120 molecules derivatives of 1, 8-Diamino - 2, 4, 5, 7 - tetrachloroanthraquinone we chose 10 molecules with best minimum binding energy and drug likeness. The chosen molecules showed hydrogen bonding with amino acid VAL 147 of protein. These 10 reported molecules are promising as drug, which will help in stabilizing p53. They wait to be verified experimentally by testing them in vitro and in vivo to reach for candidate drugs.

References:
ABSTRACT:

Background: Plumbagin (5-Hydroxy-2-methyl-1,4-naphthaquinone) is isolated from different species of Genus Plumbago. Literature revealed that high amount of plumbagin found in the roots of Plumbago zeylanica and P. indica. Objectives: Plumbagin has a diverse role in the treatment of various disorders such as cancer, ulcer, diabetes, malaria and cardiovascular etc. This review complies different ethnobotanical and traditional uses on Genus Plumbago and various pharmacological activities of plumbagin. Methods: Data on selected topic have been compiled from Pub Med, Research Gate, Science Direct, Chemical Abstract and Google Scholar. Conclusion: In this study, we have concluded that high amount of Plumbagin can be isolated from Plumbago zeylanica and P. indica. It has a potential effect in the inhibition of intestinal carcinogenesis, inflammation and as a neuroprotective against cerebral ishchemia.

Keywords: Plumbagin, Anticancer, Antimalarial, Plumbago, Traditional roles, Chemistry

INTRODUCTION:

Plants produce secondary metabolites that are responsible for normal cell growth and its development. These metabolites are also having therapeutics pharmacological activities. Out of different types of secondary metabolites, phenols have their own significant role. Structurally they are aromatic ring with one or more hydroxyl groups. Oxidation of phenols derived lipid soluble compounds, called as quinones. When quinones are fused with other aromatic ring they form a compound named as napthoquinone. Commonly used isomers of napthoquinone are 1,2- napthoquinone and 1,4-napthoquinone. Generally they are found in reduced, monomer, dimers or trimers form or may be in glycosidic form. Napthoquinones are widely occurring in families like Bignoniaceae, Boraginaeaceae, Droseraceae, Ebenaceae, Juglandaceae and Plumbaginaceae. In plant species, biosynthesis occur by different pathways such as acetate-malonate pathway for Plumbagin and Lawsons follow shikimate succinyl CoA pathway. They have been found as an antibacterial, antioxidant, anti-inflammatory, antifertility, hypolipidemic, antiestrogenic, antidiabetic, antifungal and anticancer compounds [1]. Recently, antifeedent activity of Plumbagin is also reported which described its activity against
Spodoptera litura, preventing it from predator [2]. Out of these, emphasis has been given on yellow colored crystalline naphthoquinine Plumbagin, which has been used traditionally as Plumbagin was discovered in 1828, by M. Dulong d’ Astafort. He extracted this yellow crystalline compound from the roots of Plumbago europaea. Plumbagin extracted as needle shaped lemon yellow crystals having sweet taste and leaves acrid impression.

**Figure 1: Biological activities of napthoquinones**

Natural source of Plumbagin:

This naphthoquinone is generally found in Ancestrocladaceae, Dioncophyllaceae, Droseraceae and Plumbaginaceae families. It is mostly extracted from the roots of Plumbago species which has been known as significant medicinal properties. It is also present in the barks, leaves, wood and roots of black walnut (*Juglans nigra*), white walnut (*J. cinerea*) and English walnut (*J. regia*). Plumbaginaceae family contains 10 genera and 280 species. The genus *Plumbago* contains three other species, *Plumbago indica*, *P. capensis*, *P. zeylanica*. In the ancient treatise of Indian Ayurveda of Charaka, plant of this family was known as “Chitraka”, whose roots was popularly used in skin diseases, piles, dyspepsia and diarrhea.
Extraction and isolation of Plumbagin:
In 1993, Gupta et al extracted Plumbagin by silica gel column chromatography using n-hexane as solvent. HPLC of extracted Plumbagin was done using n-hexane: chloroform: 2- propanol in the ratio of 30:70:2 at the flow rate of 1 ml/min, 27 °C temperature and 267 nm wavelength and 0.04 sensitivity. After that different methods and extraction techniques have been introduced such as assistance of ultrasonic waves, cold maceration, dynamic maceration, homogenization and soxhlet apparatus [3]. Different studies have been done by using different solvent for the extraction of Plumbagin. Hseih et al macerated the roots of *P. zeylanica* using ethanol and water as solvent [4]. A novel solvent free extraction method was developed by Bothiraja et al [5]. As per study of Muralidharan et al, the maximum recovery of plumbagin from the plant parts of *P. zeylanica* was achieved using methanol as solvent in the extraction method. The yield of plumbagin was found to be 1.65 g. Plumbagin turns red in color on reaction with alkali; the test is therefore indicative of the identity of Plumbagin [6]. Israni et al, interpreted that *P. rosea* having maximum amount of plumbagin should be used in formulations, but as the plant is found in cultivated condition and not as commonly seen as *P. zeylanica*, the later is more frequently used [7].

Chemistry:

Figure 1: Chemical structure of Plumbagin

This compound is found to have molecular formula C_{11}H_{8}O_{3} and 188.05 as molecular weight. As per literature, it has melting point near about 76-78°C and a rough estimate of boiling point is 287.13 °C. It is very soluble in alcohol and ether, little soluble in cold water. FT-IR and THz-TDS signifies physicochemical properties of the compounds by analyzing absorption and spectra peaks. In FT-IR, bond for carbonyl groups occurs at 1664.16 cm\(^{-1}\), hydroxyl group at 3436.69 cm\(^{-1}\), methyl group at 1336.14 cm\(^{-1}\), peak around 1608.69 cm\(^{-1}\) signifies presence of δ ring in the structure. THz absorption peaks of Plumbagin occur at 0.85 THz which shows the presence of 1,4- naphthoquinone ring while 1.18, 1.40, 1.78 and 2.43 THz represent presence of methyl group in the structure [8]. Raman spectroscopy is an effective tool to study the vibrational spectra of chemical compound. Vibrational analysis of Plumbagin was done by Sajan et al on the basis of presence of carbonyl, hydroxyl, methyl and ring in
structure. Decrease in intensities and enhanced wavenumber stretching is due to hyperconjugation of methyl group with aromatic ring. There is a splitting in carbonyl vibrational mode which may be due to intramolecular association. A slight disturbance in benzene ring occurs due to the condensation of the two rings, which consequently lower the wavenumbers [9]. Estimation of Plumbagin was done by Israni et al in different species of *Plumbago zeylanica*, *P. rosea*, *P.capensis* and *Vogelia indica* and found the amount of Plumbagin 0.39%, 1.7%, 0.27% and 0.15% w/w. Absorbance obtained at 520 nm were 0.416, 0.424, 0.321 and 0.692 respectively [7].

**Pharmacological studies:**

Oral administration of Plumbagin (100 mg/kg) in rats evaluates its maximum peak concentration 0.35 µg/ml and half life of 1028 minutes. Area under curve of Plumbagin was found to be 271* µg/ml. It has dose related side effects. Plumbagin was found to be nontoxic at the dose of 2 mg/kg body weight intraperitoneally or 200 ppm when given in diet. Although it showed some side effects at the dose range of 8-65 mg/kg b.w. orally and 16 mg/kg by i.p route in mice [10]. About 49% of Plumbagin excrete out in feces when single oral dose of 100 mg/kg was given to mice. Maximum serum concentration reported after 1 hr was calculated as 0.35 mg/kg, after that it started to decline [4].Some reported side effects are diarrhea, increase in acid phosphatase, serum phosphatase, neutrophil and white blood cells. No case report and study has been found which investigate the toxicity of Plumbagin in the literature [11]. Various pharmacological action of Plumbagin is described in table 1.

<p>| Table 1: Various pharmacological activities on different invitro/ invivo models |</p>
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Pharmacological action</th>
<th>Invivo/ invitro model</th>
<th>Dose</th>
<th>Duration</th>
<th>Mechanism of action</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antiatherosclerotic, hypolipidaemic</td>
<td>Cholesterol induced hyperlipidemia</td>
<td>30 mg/kg</td>
<td>60 days</td>
<td>Marked reduction in LDL cholesterol and serum cholesterol by 61.0% and 53.0%</td>
<td>[12]</td>
</tr>
<tr>
<td>2</td>
<td>Antimicrobial</td>
<td>Invivo mouse macrophages</td>
<td>25 to 50 µg/ kg</td>
<td>8 weeks</td>
<td>It prevent antibiotic resistance in E.coli and S.aureus</td>
<td>[13],[14]</td>
</tr>
<tr>
<td>3</td>
<td>Anti-inflammatory</td>
<td>Surgically induced osteoarthritis</td>
<td>2 mg/ kg</td>
<td>8 weeks</td>
<td>NF-κB activation, inhibition of T-cell proliferation, suppressed expression of activation markers CD69 and CD25</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>Category</td>
<td>Compound/Model</td>
<td>Dose/Method</td>
<td>Duration</td>
<td>Effect</td>
<td>Reference</td>
</tr>
<tr>
<td>---</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>4</td>
<td>Anti malarial</td>
<td><em>P. berghei</em> infected mouse model</td>
<td>1, 10, 25 mg/kg</td>
<td>4 days</td>
<td>Inhibitory action on the reduced parasitaemia and prolonged survival time</td>
<td>[16]</td>
</tr>
<tr>
<td>5</td>
<td>Antifungal</td>
<td>(Alternaria sp., Aspergillus flavus, A. niger, Cladosporium sp., Candida albicans, C. glabrata, C. krusei, C. tropicalis, Cryptococcus neoformans, Fusarium sp, Geotrichum candidum, and Penicillium sp.)</td>
<td>Cup plate method, 400 µg/mL</td>
<td>48 h</td>
<td>Delay germination and viability of the fungus and at high dose completely inhibit its growth</td>
<td>[17]</td>
</tr>
<tr>
<td>6</td>
<td>Hepatoprotective</td>
<td>Thioacetamide induced liver injury</td>
<td>2 mg/kg</td>
<td>6 weeks</td>
<td>Reduced liver congestion and inflammation, decreased neutrophils and macrophages</td>
<td>[18]</td>
</tr>
<tr>
<td>7</td>
<td>Neuroprotective</td>
<td>Focal ischemic stroke</td>
<td>3 mg/kg</td>
<td>12, 24, 46, 72 h</td>
<td>Activate adaptive cellular stress response pathways</td>
<td>[19]</td>
</tr>
<tr>
<td>8</td>
<td>Cardioprotective</td>
<td>Guinea pig papillary muscle</td>
<td>$3 \times 10^{-6}$ M</td>
<td>30 min</td>
<td>Positive inotropic effect</td>
<td>[20]</td>
</tr>
<tr>
<td>9</td>
<td>Anti HIV</td>
<td>RNase H assay, DNA polymerase I assay</td>
<td>100 µM</td>
<td>30 min</td>
<td>Inhibitory activity against RNase, 59.9% inhibition</td>
<td>[21]</td>
</tr>
<tr>
<td>10</td>
<td>Antioxidant</td>
<td>Lipid peroxidase</td>
<td>1 to 16 mg/kg</td>
<td>24 h</td>
<td>Decrease in ascorbate and NAPDPH dependent lipid peroxidase level up to dose of 4 mg/kg</td>
<td>[22]</td>
</tr>
<tr>
<td>11</td>
<td>Radio sensitizing effects</td>
<td>Ehrlich ascites carcinoma</td>
<td>5 mg/kg</td>
<td>5 days</td>
<td>Increase in number of S phase and G2 M cells</td>
<td>[23], [24]</td>
</tr>
<tr>
<td>12</td>
<td>Anticancer</td>
<td>Lung cancer cell lines (A549 and H460)</td>
<td>MTT assay</td>
<td>3.6, 9 µM</td>
<td>24 h</td>
<td>Significantly inhibition of H460 cells, down regulation of</td>
</tr>
<tr>
<td>Disease Model</td>
<td>Assay/Methodology</td>
<td>Concentration</td>
<td>Time</td>
<td>Effect</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>----------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Bile duct cancer (CL-6 and OUMS cells)</td>
<td>MTT assay, QCM, ECMatrix cell invasion and CIM-16 plates</td>
<td>12.5 to 50 µmol/L</td>
<td>6,12,18 and 24 h</td>
<td>Inhibitory action on cell growth, induction of cell apoptosis</td>
<td>[26]</td>
<td></td>
</tr>
<tr>
<td>Human breast cancer cell lines (MDA-MB 231 and MCF 7)</td>
<td>XTT assay</td>
<td>0.2, 5, 10, 20 µmol/L</td>
<td>48 h</td>
<td>QCM ECMatrix cell invasion</td>
<td>[27]</td>
<td></td>
</tr>
<tr>
<td>Hepatocellular carcinoma</td>
<td>3MeDAB induced hepatoma</td>
<td>4 mg/kg</td>
<td>4 weeks</td>
<td>Reduces glucose metabolizing enzymes in rat hepatoma</td>
<td>[28]</td>
<td></td>
</tr>
<tr>
<td>Promyelocytic leukemia</td>
<td>NB4 tumor xenograft</td>
<td>2 mg/kg</td>
<td>3 weeks</td>
<td>Induced reactive oxygen species in leukemia cells</td>
<td>[29]</td>
<td></td>
</tr>
<tr>
<td>Intestinal carcinogenesis</td>
<td>Azoxy methane induced carcinogenesis</td>
<td>200 ppm</td>
<td>3 weeks</td>
<td>Act as a blocking agent in AOM induced carcinogenesis</td>
<td>[30]</td>
<td></td>
</tr>
<tr>
<td>Prostate cancer cell line</td>
<td>Cell invasion assay, Apoptosis</td>
<td>0.5, 10, 15 µmol/L</td>
<td>48 h</td>
<td>Induction of Reactive oxygen</td>
<td>[31]</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion:

Plumbagin has been used in integral part of Indian Subcontinent as a traditional ayurveda and siddha medicine. It exhibits various biological activities which is due to its basic chemical structure of naphthoquinones. Literature revealed that it has efficient anticancer potential on different models. Various formulations have been developed which decrease its toxic effects as well as increase its activity during the treatment of human malignancies. This study concluded relevant data beginning from its origin to its pharmacological action and pharmacokinetic study which will help as an informative tool in the study of this compound.

Reference:

ABSTRACTS
ORAL PRESENTATIONS
O1
Synthesis and Urease Inhibition Activity of 4-hydroxy-3-methoxy Derivatives

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A number of 4-hydroxy-3-methoxy benzoic acid (vanillic acid) compounds were prepared and evaluated for urease inhibition activity. All the lately prepared compounds were characterized by IR, 1H NMR spectroscopic techniques. Synthesized compounds were screened for Urease inhibition activity against jack bean urease by using indophenols method. Results exposed that compound 3, 14 and 17 with IC50 values of 33.52 µg/ml, 32.41 µg/ml and 30.06 µg/ml were establish to be most active urease inhibitors comparable to standard thiourea (IC50: 33.50 µg/ml). Hence newly synthesized derivatives of vanillic acid derivatives exhibits considerable urease inhibition potency.

Keywords: Vanillic acid, Synthesis, Urease inhibition.

O2
Pharmacological Screening of Griseofulvin Loaded Solid Lipid Nanoparticles for Improved Oral Delivery of Poorly Water-Soluble Drug

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In current research, Griseofulvin-loaded solid lipid nanoparticles (SLNs) were prepared using glyceryl monostearate (GMS) as a lipid by hot homogenisation method. Griseofulvin was selected as a model drug for BCS (Biopharmaceutics Classification system) Class II drugs. The SLN batches were optimized based on average particle size, drug entrapment efficiency, drug loading and percentage yield. The optimized SLN composition was characterized in terms of particle shape and size, drug entrapment efficiency, drug loading and in vivo antifungal activity against Microsporum canis using albino rat model for the treatment of dermatophytosis. The bioavailability of drug after oral administration in albino rats was found to be significantly higher as compared to the conventional dosage form of drug. A complete mycological and clinical cure was observed during the study in M. canis infected albino rats. It can be concluded from our study that SLNs improves the oral delivery of poorly water soluble drugs like griseofulvin that belongs to BCS Class II drugs.

Keywords: Griseofulvin, Solid lipid nanoparticles, BCS Class II, In-vivo study
O3

Molecular Docking, Synthesis, α-amylase Inhibition, Urease Inhibition and Antioxidant Evaluation of 4-hydroxy-3-methoxy Benzoic Acid Derivatives

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Different derivatives of 4-hydroxy-3-methoxy benzoic acid were synthesized and evaluated for their antioxidant, α-amylase inhibition and urease inhibition ability. Antioxidant evaluation was performed by DPPH radical scavenging assay and the results revealed that compounds 8, 10 and 13 as most active antioxidant agent with IC50 values of 43.09 µg/ml, 44.59 µg/ml and 43.43 µg/ml respectively. α-amylase inhibition study was performed using diastase by colorimetric method. Compound 9 showed maximum inhibition with IC50 value of 33.26 µg/ml. Compound 4 was found to possess maximum urease inhibition ability with IC50 value of 35.82 µg/ml. Molecular docking study was performed using autodock software.

Keywords: Antioxidant, α-amylase inhibition, urease inhibition, molecular docking study, SAR of 4-hydroxy-3-methoxy benzoic acid derivatives.

O4

Pharmacological Screening of Self-Emulsifying Drug Delivery System Containing Cyclosporine for Solubility Enhancement

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The objective behind the research was to increase the solubility of cyclosporine through Self Emulsifying Drug Delivery System that will increase the bioavailability and reduce the side effects of the drug. The SEDDS was prepared by hot homogenisation method and evaluated for droplet size, zeta potential, polydispersity index, drug loading, in-vitro study and in-vivo study. In-vivo studies for cyclosporine loaded self-emulsifying drug delivery system were carried out in albino rats and the pharmacokinetic parameters i.e. Cmax, T1/2, AUC, Vd were compared with a marketed formulation, which indicated better results of the prepared formulation than the marketed one. So it is concluded that self-emulsifying drug delivery system hold potential as a drug delivery system for drug with poor aqueous solubility.

Keywords: Cyclosporine, Bioavailability, Hot homogenisation method, In-vivo study
O5
Pharmacoeconomics reduce healthcare cost in India: A review
Rajveer Singh, Ranjeet Kumar, Neelanshi Singal *
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*E-mail: neelanshi12@gmail.com

Background: Main purpose of pharmacoeconomics study in India is to make healthcare resources affordable to every Indian. It’s a way by which health care can provide their services without any personal benefits or pressure. Due to patent laws, new drugs launched in the market are costlier than the older ones which increase the cost of treatment incognizant to common people.

Objective: The aim of study is to reduce healthcare cost in India by minimizing analysis and alternative therapies.


Result: The present review suggested that pharmacoeconomics help to get optimal therapy in cost effective manner, economical evaluation of pharmaceutical product and alternative healthcare outcome evaluation.

Conclusion: Pharmacoeconomic study is needed in India so that irrespective of any financial, educational background, anyone can get world class medical treatment.

Keywords: Pharmacoeconomics, Optimal therapy

O6
A Study on Complications of Hyperthyroidism in Pregnant Women-A Review
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2Department of Pharmaceutical Chemistry, Nims Institute of Pharmacy, Rajasthan
*Email: nikitapall192@gmail.com

Background: There is a frequent correlation between hyperthyroidism and complications in pregnancy. Pregnancy is a major risk factor in developing thyroid dysfunction. Object: The present study presented a brief review on different complications of hyperthyroidism in pregnant women. Methods: A web-based search was made to make a successful review. The search was made in different search engines viz. PUBMED, SPRINGER, ELSEVIER, GOOGLE scholar etc. and several research articles, review papers, conference preceding, unpublished work were screened. Result: The diagnosis of hyperthyroidism is also difficult during pregnancy due to 123I thyroid scanning is contraindicated by the small amount of radioactivity. Conclusion: Therefore, we can surely able to conquer hyperthyroidism in pregnant women if the treatment is given to such patients delicately.

Keywords: Hyperthyroidism, Anti-thyroid drugs, Fetal abnormality, Thyroid, Autoimmune thyroid disease, congenital anomalies, Grave’s disease.
O7

A Review on Trend in Antimicrobial Resistance in Hospital
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Day by day microbes are getting resistance towards antibiotics due to unnecessary use, over and under dosing, improper duration of administration. To address the problem, surveillance program need to be controlled to monitor the exposure in including misuse. Physician was highly influenced by the manufacturer and there is gape between the knowledge and practice of antibiotic. Antimicrobial prescribed frequently as empirical therapy and without considering the culture sensitivity tests. Different study shows antibiotic resistance and new infection causing strain were found which were not able to treat and require higher class antibiotics. Proper intervention should be made for rational use of antibiotic and to stop prevalence of antimicrobial resistance.

Keywords: Antibiotics, Antimicrobial resistance and antibiotics use.

O8

Phytochemical Standardization of Extracts Aerva javanica Linn. Flowering Tops through Determination of Total Phenolic, Flavonoid and Flavonol Content
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Aerva javanica (Amaranthaceae) is a grey coloured woolly perennial tomentose shrub. It’s traditional and folklore usage motivates further investigation on its pharmacognostic parameters and pharmacological potential. Therefore, in order to establish its standardization parameters, few phytochemical determinants were analysed using UV-spectrophotometer, which include- total phenolic, flavonoid and flavonol content. Total phenolic content was determined using gallic acid as standard- 116.627 mg Gallic Acid Eq/g for CE, 243.930 mg GA Eq/g for DEE fraction and 201.230 mg GA Eq/g for EAF fraction. Total flavonoid content was determined using quercetin as standard- 14.000 mg Quercetin Eq/g for CE, 248.500 mg Q Eq/g for DEE fraction and 2.500 mg Q Eq/g for EAF fraction. EAF had shown maximum flavonol content (13.201 mg Rutin Eq/g) followed by DEE (2.167 mg Rutin Eq/g) and CE (0.521 mg Rutin Eq/g) using rutin as standard.

Keywords: Aerva, total phenolic, Rutin , Total flavonoid, Total flavonol, Quercetin
O9

Accuracy and Quality of Spirometry in Hospital
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*E-mail: sachin9804284@gmail.com

Background: Spirometry is considered as one of the essentials tool for diagnosis of various respiratory diseases. Spirometry in health care system is matter of concern due to its inappropriate use. Objective: The aim of the study is to assess the accuracy and quality of spirometry in hospital. Method: We used 10 spirometers and tested some parameters for this process which were Forced Vital Capacity, Forced Expiratory Volume in First 1 Second, Peak Expiratory Flow, FEV1/FVC%, Forced Expiratory Flow during the middle half of Forced Vital Capacity. Result: Accuracy criteria matched only 2 out of 10 spirometers and obstruction of spirogram caused 25% percentage error. Conclusion: Study shows that the spirometry test in hospital was not up to the mark and procedure were not followed properly.
Keyword: Spirometry, Spirometer, Accuracy, Quality

O10

Assessment of Superoxide Scavenging and Total Antioxidant Potential of Hydroalcoholic Extract of Aerva javanica Linn. Flowering Tops
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Aerva javanica (Amaranthaceae) is a grey coloured woolly perennial tomentose shrub. Therefore, in order to establish its antioxidant potential, superoxide scavenging and total antioxidant potential were determined. Hydro-alcoholic extract (CE) was prepared from flowering tops of A. javanica. For both models, ascorbic acid was used as standard antioxidant compound. Superoxide scavenging potential in term of SOD expressed as IC50 which was 149.464 µg /ml for complete extract (CE), 113.228 µg /ml for DEE and 61.904 µg /ml for EAF in contrast to 132.413 for standard ascorbic acid. This was equivalent to 6.691 Eq SOD units/mg (CE), 8.832 Eq SOD units /mg (DEE) and 16.154 Eq SOD units /mg (EAF) per mg of sample respectively against 7.552 Eq SOD units /mg of standard. Total antioxidant capacity was found to be 70.33 mg Ascorbic acid Eq /g, 143.67 mg Ascorbic acid Eq /g and 283.67 mg Ascorbic acid Eq /g. Results indicated the SOD values and total antioxidant power of DEE and EAF fractions even better than standard ascorbic acid which expressed the prospective potential of fractions (DEE and EAF) against metabolic disorders.
O11
Designing, Synthesis and Biological Evaluation of 1, 5-Benzodiazepine Derivatives
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Background: The benzodiazepine structure has been demonstrated to bear important biological activities. Objective: The aim of the present work is to design novel 1, 5-Benzodiazepines using Molegro Virtual Docker followed by their synthesis and biological evaluation. Methods: Different benzodiazepine derivatives were synthesized using suitable synthetic procedures. The synthesized compounds were characterized using IR, NMR and MS. Then the compounds were tested for their CNS Depressant activity using in vivo animal models. Results: Some of the derivatives exhibited the biological activity as predicted by the Molegro Virtual Docker indicating the potentially active agents. Conclusion: The above results establish the fact that benzodiazepine can be a rich source of exploitation. There in the search of new drugs it may be a worthwhile to explore the possibility in this area by replacing different moieties and increasing the potency.
Keywords: Benzodiazepines, CNS depressant activity, Molegro Virtual Docker

O12
Exploration of Autonomic Involvement in Mechanism of Antinociceptive Activity of Flowering Top Extract of Aerva javanica Linn.
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Aerva javanica (Amaranthaceae) is a grey colored woolly perennial tomentose shrub. Therefore, in order to establish its mechanism behind its antinociceptive potential, involvement of autonomic receptors was explored. Acetic acid writhings model was used to explore receptor involvement. The cholinergic involvement was found significant (p<0.05). Effects were not significant enough to state the proper involvement of any type of α-adrenergic (peripheral and central both) autonomic receptor but significant (p<0.001) involvement of β-adrenoceptors was suggested. Involvement of cholinergic receptors was also obtained (p<0.05) with flowering top extract of Aerva javanica. Therefore, there is still a need to work on selectivity of β-adrenoceptor and cholinergic involvement.
Keywords: Aerva, Atropine, Adrenergic, Yohimbine, Prazosin, Cholinergic
O13

Microparticulate Formulations as Emerging Drug Delivery Approach
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To develop the biopharmaceutical activity of the drug dosage system like microparticles, nanoparticles. This challenge mainly focused on different classes of microparticles. Microparticles mainly aim to minimize drug degradation upon administration, prevent undesirable side effects, and increase drug bioavailability. Microparticles have made a breakthrough by means of physical application. That’s the reason why the microparticulate system became the most advanced in the field of remedy by maintaining therapeutic benefits. Some of the innovative concepts like micro delivery, sustained release, etc have already become a breakthrough. The main concept of this paper is to study various aspects of the microparticulate drug delivery system including the method of formulation, evaluation & characterization.

Keywords: Microparticles, Emulsion, Site specificity, Targeted drug delivery system, Evaluation

O14

Effect of Bedaquiline in Tuberculosis Resistance-A Review
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Background: Bedaquiline is one kind of bacteriocidal drug which belong to new class of antibiotic that is called Dairyquinoline. Bedaquiline are specially to treat TB patients with Mycobacterium tuberculosis that resistance develops with Rifampin as well as Isoniazid and other anti-tubercular agent that directly inhibit to ATP synthates enzyme. Object: The aim of the study is to review on efficacy of bedaquiline in tuberculosis. Method: A web-based research has been done by screening of different research article, conference precedings and review articles related to antibiotic bedaquiline in tuberculosis resistance. Result: Bedaquiline is the most effective against Mycobacterium tuberculosis as a compare to other antimycobacterial agents like first line drugs and other second line drugs. Conclusion: If benefits can be empirically verified our result can provide support for bedaquiline access to all patients with MDR-TB such expansion could improve health protects background MDR-TB drug and economic burden.

Keywords: Antibiotic, Multiple Drug Resistance
O15

Efficacy of Non-Steroidal Anti-inflammatory Drugs in Neuropathic Pain

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Background: Nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used in the management of neuropathic pain but not much of relevant incidence. Objectives: To assess the palliative efficacy of oral NSAIDs for neuropathic pain in middle aged group of people.

Methodology: Author searched CENTRAL, MEDLINE, and EMBASE from inception to December 2018, together with reference lists of retrieved papers and reviews, and an online trials registry Data collection and analysis: Author independently searched for studies, extracted efficacy and adverse effect data, and related issues of quality studies. Results: We included three studies involving 241 participants with chronic low back pain with a neuropathic component; 189 of these participants were involved in a study of an experimental NSAID not used in clinical practice, and of the remaining 52, only 30 had neuropathic pain. Conclusions: There is no evidence to support or confute the use of oral NSAIDs to treat neuropathic pain conditions in the middle-aged group of people.

O16

Evaluation of Impact of Hydro-Alcoholic Extract and Ethyl Acetate Fraction of Flowering Tops of “Desert Cotton” Plant on Algesic, Pyretic and Inflammatory Murine Models

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The of “Desert Cotton” plant- Aerva javanica Linn. (Amaranthaceae) is traditionally reported to be used for removal of swelling, pain and pyrexia. Analgesic potential was assessed using tail flick method. In analgesic model (tail flick method), maximum possible effect (% MPE) obtained was AJEAF (22.42%) and AJCE (500 mg/kg BW) (21.16%). AJCE (250 mg/kg BW) fraction showed MPE even less than 10%. Antipyretic potential (by yeast induced pyrexia) was not found prominent with maximum effect shown by AJEAF. Ethyl acetate fraction showed better results in all activities. Further, more purification and isolation from fraction is needed to exploit better potential in all three activities.

Keywords: Aerva javanica, Nociception, Freund’s adjuvant, Yeast, Carragenan
**O17**

**Structure Based Drug Design of P53 Stabilizing Drugs: Study of 1,8-diamino-2,4,5,7-tetrachloroanthraquinone and its Derivatives on Oncogenic Y220C Mutant**

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With a presumption that binding of small molecule targeted to the mutational cavity will stabilize the protein we have attempted with the help of virtual screening and molecular docking approach using Lamarckian Genetic Algorithm to study the binding of p53 cancer mutation Y220C with derivatives of 1,8-Diamino-2,4,5,7-tetrachloroanthraquinone. The study involved virtual screening of 1400 molecules on the basis of structure similarity of 1,8-Diamino-2,4,5,7-tetrachloroanthraquinone from PubChem database. The top molecules were selected on the basis of minimum binding energy and protein-ligand complex was created. They were then visualized using UCSF chimera for H-bond interaction between ligand and active site residues of Oncogenic Y220C Mutant which resulted in finding intricate atomic scale properties between ligand and residues Pro151, Val147 and Asp148. The top molecules then were run for in-silico ADMET and drug likeness properties in which we got promising results.

**Keywords:** docking, drug discovery, Y220C_mutant, cancer, P53

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**O18**

**Role of Microwave Radiation in Green Synthesis of Silver Nanoparticles**

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**Background:** Microwave irradiation is emerging as a rapid and environment friendly mode of heating for the formation of silver nanoparticles. **Objective:** The objective of this review is to explore the role, use and benefit of microwave radiation in biological synthesis of silver nanoparticles for their various uses. **Conclusion:** The review concludes that the microwave radiation plays a very important role in rapid, uniform and small size synthesis of biological silver nanoparticles.

**Keywords:** Green Synthesis, Silver Nanoparticles, Microwave radiation, Eco-friendly
**O19**

**Nanocystal Technology: Taking India to 21st Century**

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**Background:** Nanocrystal technology is the modern technology that involves crystal structure modification of poorly soluble drugs. **Objective methods:** The industrial relevant technologies for the production of nanocrystal involves Nanoprecipitation method. **Results:** This technology showed various applications in parental administration of drugs. **Conclusion:** Emerging future trends of Nanocrystal technology are that the drug nanocrystals of poorly soluble drug in conjugation with ligands such as monoclonal antibodies can be used in the treatment of solid tumors and also has significant application as theranostic agent by using radioactive agent as ligand.  
**Keywords:** Nanocrystal, Nanotechnology, Bioavailability, Precipitation, Homogenizing, Milling, Theranostic

**O20**

**Swiss Ball Activities to Improve Trunk Control in Post-stroke Patients**

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**Introduction:** Activities on the swiss ball allow variable platform with a narrow base of support engaging many trunk muscles together, further improving pelvic movement and balance. The present study aims to analyze the effect of Swiss ball activities on trunk control in post-stroke patients. **Material and Methods:** 30 post- stroke participants in the age group of 35 to 60 were randomly assigned in two groups. The experimental group (Group A) received conventional physiotherapy along with Swiss ball activities and the control group (Group B) received only conventional physiotherapy, 4 times per week for 3 weeks. Trunk impairment scale (TIS) was used to evaluate the trunk control. **Results:** The mean difference of TIS score of Group A was 4.30 (p<0.05) and Group B was 2.87 (p<0.05). The mean difference of post intervention TIS score of Group A and Group B was 1.36 (p<0.05). **Conclusions:** Swiss ball activities are more effective than exercises done on the plinth in improving the trunk control. **Keywords:** Swiss Ball, Stroke, Trunk Control, Trunk Exercises, Trunk Impairment Scale.
O21

Determining Incidence and Factors Associated with Sacroiliac Joint Pain among Thermal Power Plant Employees of N.T.P.C Dadri.
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Background: Thermal power plant industry involved various procedures and operations starting from coal crushing to electrical energy generation. The workload in this industry is gruesome, both physically and psychologically, as a minor fault can lead to a major accident.

Method: In the present cross-sectional study, out of a population of 798 employees, 138 returned a duly filled questionnaire. The shortlisted subjects with low back pain were further assessed for sacroiliac joint pain using Lanslett test cluster of six tests (Gaenslen’s test, SI joint distraction test, SI joint compression test, Sacral thrust test and Thigh thrust test and Pattrick test).

Results: 62 (44.9%) subjects have their low back/hips and thighs, with or without pain radiating down to the legs. 50 (36.2%) & 12 (8.7%) subjects were diagnosed with low back pain SI joint pain respectively. Presence of sacroiliac joint pain was significantly associated with the variables age, work hour per week, tenure of service and shift hours.

Conclusion: The study highlighted the issues and repercussions of uneven pattern of shift and suggested that if feasible a long term pattern of shift should be considered to prevent their employees from developing systemic stresses. Keywords: SI Joint Pain, Incidence, Thermal Power Plant

O22

Effectiveness of 6 Weeks of Combined Exercises and Breathing Exercises on Factors of Diabetes Control in Asian Indian Type 2 Diabetes Patients
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Background: Breathing exercises and aerobic exercises have shown improvement in glycemic regulation. Objective: To investigate the effects of combined (aerobic + resistance) exercises program and breathing exercises on glycemic outcomes (HbA1c), fasting blood glucose (FBG), lipid profile and well-being in type 2 diabetes patients.

Methods: 45 Individuals (25 M, 20 F) aged 40-70 years with type 2 diabetes were randomly distributed to a 6-week program

Results: General well-being (GWB) improved by 17.46% and 21.48% (p<0.05) in the both group A and B respectively. Significant improvement was also observed in all cardiovascular parameters.

Conclusion: Breathing exercises and combined (aerobic+ resistance) exercise protocols were effective in improving glycemic control as well as cardiovascular fitness parameters. However, combined exercise programs demonstrated better efficacy as compared to breathing exercises group.

Keywords: Type 2 diabetes, breathing exercises, combined exercises, general well being
O23

Food Safety in Hospitals
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Background: In the complex healthcare environment like that of India a very important issue in hospitals is the attention to food safety by the staff of the hospital. India is a tropical country and there is ignorance with respect to food borne illnesses. In general most illnesses caused due to food goes unrecognized. The patients who come to hospitals may be elderly, may have chronic disease or can be immune-compromised due to various reasons. This makes them more vulnerable to diseases that occur due to contaminated food.

Method Used: The study was conducted by secondary data analysis, Online journals, articles and books were referred for the study.

RESULT: There was a general observation of lack of knowledge about causative agents associated with food borne diseases by the hospital staff. The main issue faced is training and compliance to policies (of the staff) with respect to food safety.

Conclusion: In the hospitals there has to be proper management of food to decrease food safety related issues. To reduce the damage of diseases from contaminated food, the hospital need to emphasize on the food safety by training of the staff and compliance to policies related to food safety.

Keywords: Food safety, Hygiene, Hospital, Staff

O24

Need for Risk Factor Surveillance of Inflammatory Bowel Disease in Indian Settings
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Purpose: This review article was done to explore the risk factors of Ulcerative colitis and Crohn’s disease in an Indian setting. Methods: A literature search was conducted using the database PubMed for studies published between 2012 and 2018 and focusing on the population-based studies on humans showing epidemiology and risk factors of IBD. Results: Ten studies were included in the final analysis from which only two studies (n=2) specified the exact location. The factors such as age, gender, smoking, alcohol, family history, treatment history, diet, access to hygiene and sanitary facilities, extent of disease and use of OCP’s were significantly associated with the outcome. Conclusion: Further research is needed to explore the risk factors and epidemiology of Ulcerative colitis and Crohn’s disease in particular and to find the preventive measures for IBD patients.

Keywords: Inflammatory bowel disease, India, Risk factors, Epidemiology, Secondary data
Pharmacoeconomics of Anti-hypertensive drugs
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Context: Hypertension, also termed as high blood pressure, is a long term medical condition which is a major cause of morbidity, mortality and needs lifelong treatment. This condition also leads to complications like stroke, myocardial infarction and chronic kidney disease. Wide price range of antihypertensive drugs are available in regulated (India) and less regulated market (US).

Objective: To analyze price variation of unit dosage form manufactured by pharmaceutical companies for same formulation with same strength in both regulated and less regulated markets by calculating the percentage price variation amongst them.

Methods and Material: Cost of particular unit drug, in same strength was obtained from “Current Index of Medical Specialties” (CIMS) and “Indian Drug Review” for regulated market and from “GoodRX” and “Online Pharmacies” for less regulated market in both INR and USD.

Results: The percentage price variation is less in US than in India, but prices are extremely high. In India, price of ACE inhibitor (Enalapril 2.5mg) was found to be INR 0.60 (USD 0.009) whereas in US market it was INR 178.81 (USD 2.7501).

Conclusions: Our findings revealed that the prices of various antihypertensive formulations show great variation. Modification in price regulation is required in US to reduce unfair burden on both patient and the health care system.

Keywords: Anti-hypertensive, DPCO (Drug Price Control Order), Price variation, regulated market, less regulated market.
ABSTRACTS
POSTER PRESENTATIONS
P1
Protective Effect of Bioflavonoid (Chrysin) on Scopolamine Induced Memory Impairment in Albino Mice
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Background: Chrysin (5, 7-dihydroxyflavone), one of the most extensively studied natural flavones, is commonly found in many plants extracts. Objective of study: To evaluate the protective effect of Chrysin on scopolamine induced memory impairment in mouse. In this study, the effect of Chrysin on memory impairment and oxidative stress were investigated in mice. Material and method: Memory impairment was persuaded in albino mice. Mice were treated 60 days with Chrysin (15mg/kg; oral) and after 60 days induction is given with scopolamine (1mg/kg, i.p) and then behavioral test investigated in open field, passive avoidance and Morris water maze. Results: Results demonstrate that Chrysin (15mg/kg) could improve the memory impairment of scopolamine induced mouse in behavioral tests. Meanwhile Chrysin significantly decreased MDA (malondialdehyde) level in hippocampus and Increases SOD (superoxide dismutase) activity in this model. Conclusion: The results show that chrysin can effectively improve the scopolamine memory impairment in albino mice and the neuroprotective effect is mainly related to the modification of cholinergic neuronal systems and the modulation of oxidative stress.

Keywords: Chrysin, Scopolamine, Oxidative stress, Morris water maze, passive avoidance

P2
Design and Characterization of Orodispersible Tablets of Ketorolac Tromethamine
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Objective and Methods: This study was aimed to form Ketorolac Tromethamine mouth dissolving tablets by direct compression using Superdisintegrants as crospovidone, carboxymethyl cellulose calcium, sodium steryl fumerate. FTIR & UV Spectroscopy were performed to indicate any possible interactions between the drug with used excipients.

Result and Conclusion: The absorption maxima of ketorolac tromethamine (5 micro gm/ml) in this solution was found to be 372 nm which is concordant with IP(1996). Hardness- 2.8 to 4.2 kg/cm². Disintegration time with superdisintegrant showed disintegration time between 8 to 22 seconds, Sodium steryl fumarate was observed to be the best superdisintegrant.

Keywords: Orodispersible, Ketorolac Tromethamine, Inflammation, Mouth dissolving
P3

Advancement in Diabetic Therapy
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Relatively, a large percentage of world population is affected by diabetes mellitus, out of which approximately 5-10% with type 1 diabetes while the remaining 90% with type 2. Insulin is a difficult drug to ingest orally, as it is a protein that degrades in the stomach and small intestine, which makes it almost impossible to design an oral pill or tablet. Giving diabetes patients the chance to avoid the pain of needles has been the goal of many pharmaceutical companies for many years. However, the inhalation delivery system Exubera has been already become clinically available in the United States and Europe but making an insulin pill is still a big challenge especially for pharmaceutical experts.

Key words: Diabetes, Insulin, Oral dosage form

P4

Recent Banned Drugs in India
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A drug is a chemical or synthetic substance used in the cure prevention or diagnosis of disease or used to enhance physical or mental wellbeing. Drugs Undergo rigorous testing before they are introduced in market. Due to these types of adverse effects, the country bans these drugs. In India the Drug Controller General of India is the highest authority to approve or to ban a drug. The union health ministry on 12th September 2018 banned the manufacture, sale, or distribution of 328 varieties of fixed dose combination (fdc) for human consumption. The action was taken under section 26A of drugs and cosmetics act 1940 with help of drug technical advisory. Some of the example of banned FDC drugs are Aceclofenac (SR) + Paracetamol 750, Albuterol + Bromhexine + Theophylline 1033, Aceclofenac + Zinc Carnosine 745, Amoxicillin + Diloxacinlin 753, Calcium Gluconate + levocetirizine 994, Cetirizine + Diethyl Carbamazine.

Keywords: Fixed dose combination, Adverse effect, Clinical trials
P5

Biological activities of 1, 2, 4 – Triazole derivative: A Comprehensive Review

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1, 2, 4-triazole, is an isomer of triazole that is an important heterocyclic nucleus present in a large number of compounds and its derivatives possess a great importance in medicinal chemistry. This review article covers the information over active 1, 2, 4-triazole derivatives having different biological activities such as antimicrobial, antioxidant, anticancer, anticonvulsant, anti-inflammatory, antidiabetic, antiepileptic and surface activities. Thus 1, 2, 4-triazole acts as an auspicious medicinal agent for researchers working over this field. The present review article focuses on the biological potential of 1, 2, 4-triazole and also helpful to develop various new compounds that could be better in terms of efficacy and lesser toxicity.

Keywords: Triazole derivatives, Antimicrobial, Antioxidant

P6

Drug Interaction: A Review

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A drug interaction results when a substance (drug, food and beverage) affects / alter the activity of object drug. Drug-drug interactions occur when a drug interacts, or interferes, with another drug. This can alter the way one or both of the drugs act in the body. A drug interaction can make a drug less effective, increase the action of a drug, or cause unwanted side effects. Or in certain specific situations a drug may even react with itself, such as occurs with dehydration. Based on consequences some drug interaction are beneficial (codeine + paracetamol = increase analgesic effect) and some have adverse effects (decongestants + antihypertensive=High BP). Drug interactions are usually divided into four groups: antagonism, synergism, potentiation, and interaction with metabolism. Drug interactions may be the result of various processes and cause alterations in the pharmacokinetics of the drug, alternatively, drug interactions may be the result of the pharmacodynamic properties of the drug, e.g. the co-administration of a receptor antagonist and an agonist for the same receptor. Some drugs combinations which are recently banned due to their adverse effects: Carbidopa with Levodopa, Phenytoin with Phenobarbitone, Histamine with Adrenaline, Glucagon with Insulin. Diclofenac with Tramadol and Paracetamol.

Keywords: Drug interaction, Adverse effects, Antagonism
P7

Role of Anticancer Herbs in Oxidative Stress and Cancer

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Cancer is a disease that results when cellular changes cause uncontrolled growth of cell and division of cells it is a multistage process that involves 3 distinguishable interconnected stages viz. initiation, promotion, and progression. The predominant causative factor is oxidants and free radicals induced DNA damage. Both reactive oxygen species (ROS) and reactive nitrogen species (RNS) referred to as oxidants and generated as by-products of oxygen and nitrogen metabolism. When the antioxidant control mechanism is infested, The cellular redox potential shifts towards oxidative stress. As a consequence, the potential for damaging cellular nucleic acids, lipids, and proteins increases. So any imbalance between free radicals and antioxidants is the fundamental supposition of oxidative stress.

Dietary agents and supplements are major sources of antioxidants. Different herbal sources of antioxidants have proved helpful in combating oxidative stress thus targeting cancer. Many phytochemicals present in herbs have been implicated in combating oxidative stress-induced diseases such as cancer.

Keywords: Cancer; Oxidative stress; ROS; RNS; Dietary agents

P8

Assessment of Comparative Study on Monotherapy & Combination Therapy in Hypertension

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Background: Hypertension is an elevated blood-pressure, in which long-term force of blood against artery walls or may be narrowing of arteries. Objective: The aim of study is to evaluate combination therapy is more effective compare to monotherapy. Method: Mostly in 20 to 80 years patient in stage-1 hypertension Systolic Blood Pressure ≥ 150mmHg; Diastolic Blood Pressure ≥ 95mmHg, may be treated with Angiotensin Receptor Blocker (Telmisartan 40mg) with thiazide-diuretic (Hydrochlorothiazide 12.5mg). In case of stage-2 Hypertension Systolic Blood Pressure ≥ 160mmHg; Diastolic Blood Pressure ≥ 100mmHg patient may be treated with Angiotensin Receptor Blocker with Calcium Channel Blocker (Amlodipine 5mg).

Conclusion: In combination therapy on above mention 3 drug classes are more effective to achieve normal blood pressure.

Keyword: Hypertension, Angiotensin Receptor Blocker, Thiazide-diuretic, Calcium Channel Blocker.
P9

Impact of Patient Counseling on Coronary Artery Disease
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Background: Coronary artery disease is commonest type of heart disease. It is leading cause of death in developed countries nearly more than one third of all deaths individuals over age 35. Coronary artery disease is a type of blood vessel disorder due to fatty deposition called plaque inside coronary arteries thus path inside arteries become narrower leading to less supply of blood to the heart. It can lead to chest pain (angina) or a heart attack. It may also weaken the muscles of heart contributing to arrhythmias and heart failure. Objective: To evaluate effect of patient counseling on morbidity, motility in coronary artery disease. Methods: Selected review articles and analyse the data for impact of patient counseling, Patient counseling is a term used for health care professionals to increase patient knowledge of health care issue. Conclusion: Personalized pharmacist counseling and education should be given to coronary artery disease patients. It includes information regarding the disease, treatment goals, and the importance of medication adherence, possible adverse drug reactions, management of disease and lifestyle modifications. Lifestyle modification like exercise regularly and diet includes decrease saturated fats. The patient information leaflet should be made using primary, secondary, tertiary resources for behavioral counseling of the patients. Keywords: Personalized Patient counseling, Patient information leaflet, Coronary artery disease

P10

Role of Clinical Pharmacists in Prevention of Cardiovascular Diseases
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Background: Clinical pharmacists work directly with physicians, other health professionals, and patients to ensure that the medications prescribed for patients contribute to the most precise outcomes. Objective: The aim of study is to know the role of clinical pharmacists in prevention of cardiovascular diseases. Method: The Clinical pharmacists of cardiac sector can help in the management of patients with heart failure by ensuring the efficacy and safety of each patient's drug therapy. The poor adherence to a drug autocracy is one of the antagonist factors for heart failure. They can also conduct time to time patient education programmes. Result: The need of clinical pharmacist in cardiac sector can prevent the recurrent cycle of heart failure or cardiac arrest, and can help patient cure by their own lifestyle management. Conclusion: There is a major need of clinical pharmacists as they are a bridge between the patient and physician, which can help in the well-being of the patient quickly and more properly. Keywords: Clinical pharmacists, Heart failure, Cardiac, Cardiology, Drug autocracy, Cardiovascular diseases.
P11
Food Safety in a Globalizing World: Opportunities and Challenges for India
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Rising incomes and urbanization, increasing consumer awareness prompted by widely publicized food safety crises, and an expansion in agricultural exports have been important drivers for the increased attention to food safety in India. But the development of effective food safety systems is hampered by a number of factors: restrictive government marketing regulations, a weak policy and regulatory framework for food safety, inadequate enforcement of existing standards, poor market infrastructure and agricultural support services, and the predominance of small farms. Addressing food safety concerns in India is likely to require adoption of appropriate legislation; strengthening capacity to enforce rules; promoting adoption of good agricultural, manufacturing, and hygiene practices; greater collective action; and some targeted investments. Joint efforts by the government and the private sector are needed to implement these actions.
Keywords: Urbanization, Food safety, Agriculture exports

P12
Role of Clinical Pharmacist in Alzheimer Disease
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Background: Clinical pharmacists are the professionals who provide care to patients about the usage of drugs and help in disease prevention. Alzheimer is a disease where patient is unable to remember the things and there is a change in his behaviour. Objective: The main objective is to study the role of clinical pharmacist in alzheimer disease. Method: Pharmacists can play an active role in counselling of the patients of Alzheimer disease, caregivers and clinicians on the rational use of drugs as well as alternative products, monitoring or identifying drug-related problems as Alzheimer Disease has polypharmacy and it could lead to some complications such as adverse drug reactions, drug interactions, improper drug selection and inappropriate dosage form. Result: The illness can be managed by the pharmacists who are well grounded in the regulatory and clinical issues and can help patient from not getting any adverse effects due to many drugs. Conclusion: It’s a responsibility of a pharmacist to stay up to date about every drug, so a pharmacist may take care about drug therapies given to the patient. The illness can be managed by the pharmacists who are well grounded in the regulatory and clinical issues.
Keywords: Alzheimer Disease, Clinical pharmacists, Multiple Drugs.
P13
Drug Utilization Evaluation of Non –Steroidal Anti-Inflammatory Drugs in Medical Intensive Care Unit of Tertiary Care Teaching Hospital in Northern India
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Non- steroidal Anti-inflammatory Drugs (NSAIDs) are amongst the most widely used class of drug in the developing countries, as it plays fundamental role in controlling inflammation and pain. A retrospective observational study was conducted at MICU of general medicine department in National Institute of Medical Sciences & Research Hospital, NIMS University, Jaipur, Rajasthan. The data was collected from July, 2017 to September, 2017. Among 258 randomly selected patients, 146 patients were prescribed NSAIDs of which, 83(56.8%) were males and 63(43.2%) were females. Among these, highest rate of drug prescribed was observed for patients aged between 46 to 60 years, which consist of 57(39.04%) patients (31 males + 26 females). The study highlighted, need of NSAIDs usage guidelines and restriction policies for the rational prescribing of NSAIDs in pulmonary infection ,as several studies have shown increase risk of myocardial infarction with concomitant use of NSAIDs. 
**Keywords** – NSAIDs, Drug utilization evaluation, NSAIDs usage guidelines.

P14
Assessment of Neuropathy Based on Doppler’s Test
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**Background**: Diabetes mellitus is commonly referred to as diabetes, is a group of metabolic disorder in which there are high blood sugar levels over a prolonged period. Due to diabetes the high blood glucose level can damage neurons and cause diabetic neuropathy which can injure nerves throughout your body most often in nerves in your legs and feet. **Objective**: The aim of study is to know the assessment of neuropathy based on Doppler’s test. **Methods**: Diabetic neuropathy can be diagnosed by some order specific test like filament test, quantitative sensory testing, nerve conducting studies, Electromyography, autonomic testing & can be tested diagnosed through Doppler’s test. **Result**: Doppler’s test is a very powerful diagnostic tool in present day. **Conclusions**: During the early clinical stages of diseases the resistive index found during the following diagnostic test is often normal in the early clinical stages but is typically elevated in established neuropathy. Doppler’s test has overcome as a useful diagnostic tool for the detection of small fiber neuropathy but doesn’t offer a great advantage over conventional tests. **Keywords**: Diabetes, neuropathy, Doppler’s test.
P15
Angiogenesis as a Scathing Diabetic Target: Herbal Drugs as a Weapon
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The rising incidents of diabetes caused due to the lack of or resistance to insulin is an increasing worldwide concern. Along with the elevated levels of glucose in the body, various others microvasculature abnormalities such as angiogenesis; formation of new blood vessels and macrovasculature abnormalities such as retinopathy contribute toward the disclosure of characteristic symptoms of diabetes. Angiogenesis is an important causative pathological process in diabetic abnormalities and thus has been targeted for prevention and treatment of the disease. The study on herbal agents has revealed their benefits as safe and inexpensive anti-angiogenic agents. Hence, the degree of biochemical effectiveness and limitations of herbal medicines can be studied in detail for further evidence.
Keywords: Angiogenesis, Diabetes, Herbal drugs, Retinopathy, Monoclonal antibodies

P16
Identification and Quantification of Phytoconstituents in the Leaf Extracts of Aegle Marmelos Plant by HPLC
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Background: Aegle marmelos (Rutaceae) has been found to be responsible for cardiotonic, antidiabetic, hepatoprotective, cytotoxic, anti-hyperlipidemic and many other pharmacological effects. Objective: Current work includes the identification and quantification of secondary metabolites present in the leaves of Aegle marmelos. Methods: The shade dried leaves of the plant were extracted with hexane, chloroform and water, sequentially by cold maceration method. Results: The percentage yield of hexane, chloroform and water extract was 2.8, 10.47 and 40.97%. HPLC enabled the identification of eugenol, citral and trans-caryophyllene with the amount calculated in AM-H extract was 1.95, 1.74 and 0.26 % on dry weight basis respectively while in AM-C extract, only eugenol and citral were found in 1.765 and 0.065 % on dry weight basis. Psoralen and marmelosin were not detected in AM-H and AM-C extracts and this was further confirmed by HPTLC. Conclusion: In this study, method was developed for the identification of eugenol, citral, trans-caryophyllene and their quantity was determined in AM-H and AM-C extracts.
Keywords: Cytotoxic, secondary metabolites, cold maceration, quantification.
P17
Herbal Glory in Cardiovascular Complications
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Cardiovascular diseases as the name suggests involves the class of diseases associated with the pumping organ ‘heart’ and the blood vessels. Cardiovascular disease is not one individual disease but involves a number of diseases that interferes with the cardiovascular system; this includes diseases like coronary heart disease, angina, stroke, myocardial infarction, rheumatic heart disease, arrhythmias, etc. CVD’s are one of the leading reasons for deaths worldwide. Herbals have been and still in-fact an immanent part of human civilization. Herbal drugs are rich with biologically active natural phytoconstituents that have therapeutic effects and various drugs are known to have been derived from such herbs for preparations of medications. However, controversies still prevail against herbal preparations due to lack of scientific evidences thus one must be alert and should have knowledge about the interactions and adverse effects of the herbs he or she is or are consuming.

Keywords: Cardiovascular diseases, Coronary heart disease, Herbal medications, Ephedrine, Digitoxin

P18
Study on Drug Utilization Evaluation of Corticosteroid in General Medicine Ward in Tertiary Care Teaching Hospital
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Corticosteroids are of great value in treating a wide spectrum of inflammatory conditions as they provide rapid symptomatic relief, especially in the short term. The use of corticosteroids must be carefully monitored as too little corticosteroid can show poor response whereas excess administration can increase the risk of adverse reaction. Drug utilization is important pharmaco-epidemiological study which plays a role in helping the health care system to understand, interpret and improve the drug. The study highlighted, prescriptions were rational and comply with standard guidelines of corticosteroids. Involvement of a Clinical pharmacist can promote drug safety and better patient care as well as prevention of ADRs. The Establishment of steroid card for steroid usage for various indications should be done for effective utilization of steroids.

Keywords – Drug utilization review, Corticosteroids, Steroid card
P19
A Review on Postmenopausal Hormone Replacement Therapy
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Background: The main purpose of Hormone replacement Therapy is to relief from postmenopausal symptoms and replaces the hormones which are at a lower level after menopause. It is used after menopause to re-balance the level of estrogen and progesterone and also prevent chronic conditions like Cardio-vascular Diseases and Bone disease (Osteoporosis). Objective: The main objective of the study of Hormone replacement therapy is to relief from postmenopausal symptoms and replaces the hormones. Methods: Hundred postmenopausal women participate in this study. Supplement hormones: Estrogen and estrogen-progesterone therapy Result: study shows that 42% reduction in postmenopausal symptoms. Women using estrogen with progesterone would have even greater benefit in symptoms. Conclusions: The conclusion of the study is about the hormone safety with systemic and long-term use of estrogen/estrogen-progesterone therapy. The use of estrogen combined with progesterone is better than the use of estrogen alone. Keywords: Hormone replacement therapy, Estrogen, Progesterone, Menopause

P20
Assessment of Various Antimicrobial Agents Used as Surgical Prophylaxis in Different Types of Surgeries in Surgery Department of a Tertiary Care Teaching, Hospital of Jaipur, North India
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Background: The irrational use of drugs is a major problem of present day in medical practices and its consequences include ineffective treatment, development of resistance to antibiotics, adverse effects and pharmaco-economic burden on patients and society. Objective: Assessment of Various Antimicrobial agents used as surgical prophylaxis in different types of surgeries. Methods: The present prospective and observational study was carried out using a self prepare data collection form and patient consults form on the in-patients undergoing surgery. A total of 66 were enrolled during the study. Result: Out of 66 patients, 41 were female and 25 were male patients. Patients were more of age 51-60. Class of Cephalosporin was more often prescribed in the surgery than other anti-microbial and Amikacin was second most prescribed. Conclusion: Ceftriazone is the antibiotics that is mostly prescribed in the surgery and is the drug of choice in the hospital. Keywords: Antibiotics, rational use, drugs, surgical prophylaxis.
**P21**

**Herbal Pharmacovigilance**

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**Background** Herbal formulations have been constantly and widely accepted as therapeutic agents for various disorders. **Objective:** Primary objective - To understand the need for the herbal pharmacovigilance in the detection and monitoring of the adverse effects or any other possible drug-related problems, related to herbal medicine. **Method** A desk research was carried out on existing knowledge on herbal pharmacovigilance through literature review, report analysis, and data analysis. **Result** It’s found that 40,000-70,000 plant species are currently used as medicines. These herbals may come up with the insufficient and unacceptable requirements for safety, efficacy, standardization, and inconsistent production practice. **Conclusion** Herbal medicines are widely used in health care in both developed and developing countries.

**P22**

**A Comparison between Kinesiotaping and Tissue Specific Plantar Fascia Stretching Exercise Treatment in Planter Fasciitis**

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**Background:** Plantar fasciitis (PF) is a degenerative syndrome of plantar fascia resulting from repeated trauma at its origin on the calcaneus. The purpose of the present study was to compare the effect of kinesiotaping and plantar fascia stretching exercise in plantar fasciitis (PF). **Methods:** An experimental study, total sample size was 30 (Group A-15, Group B-15). For group A kinesiotaping and for Group B plantar stretching exercises was given. To find out the desire result numeric pain rating scale (NPRS) and foot functional index (FFI) was assessed. **Result:** The analysis using independent t-test. The main finding of the present study was that the t-value for pre and post NPRS and FFI was.174, 4.461 and 1.369, 2.256 respectively. **Conclusion:** From the result we concluded that the kinesiotaping was more effecting to reducing the pain in plantar fasciitis. **Keywords:** Planter fasciitis, Kinesiotaping, Stretching, NPRS, FFI
P23

Development in Online Pharmacy

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Online pharmacy market has recently seen good interaction from both customers as well as investors. Internet pharmacy is improving medical facilities, is source of higher income and offers ease of buying online medicines. The future of the Industry is highly based on the government regulations and strong supply chain infrastructure. Indian pharmacy market is ready to explode with expected compound annual growth rate (CAGR) of 23.5 % over next five years and is expected to cross $55 Billion mark by 2020. Currently the online channel contributes to only 0.06 % of total sale which is 16 times lesser than online market in retail. This gap has started to fill in last few years which is contributed to increased interest from both investors and entrepreneurs in this domain. Around 31 companies were launched in this domain which raised more than $70 Million in 2015. According to business signals platform Paper.vc., 1mg, Netmeds and PharmEasy have raised $20-46 million in 2018.

Keywords: E marketing, Benefits, Time saving

P24

Effects of Tobacco Smoking on Health

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The objective of the present study was to summarise the available documentation and testimony on the effect of smoking tobacco on the health of common people. The growing use of tobacco is a cause of great concern around the world due to its serious effects on health. Non-communicable diseases (NCDs) like ischemic heart diseases, cancers, diabetes, chronic respiratory diseases are the leading causes of death globally and associated with tobacco use. Tobacco is a major risk factor for a number of diseases affecting all age groups. A systemic essay and report search of WHO, Healthline, and effect of passive smoking on the health of kids were conducted and meta-analyzed. Qualitative and Quantitative outcomes of the association between smoking tobacco and certain disease were discussed and summarized. According to WHO, the most prevalent age, prone to smoking in India is 20 years to 21 years. There were no strict laws to control tobacco use and the term “Peer Pressure” is totally ignored by the government. The legislation enacted by the Government of India to control tobacco use and to facilitate effective implementation of the tobacco control laws were planned to be carried out.

Keywords: Tobacco, Smoking, Health effects
P25

Development and Validation of a Mass Spectrometry-Based Assay for Quantification of Insulin-Like Factor 3 in Human Serum

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Background: The circulating level of the peptide hormone insulin-like factor 3 (INSL3) is a promising diagnostic marker reflecting Leydig cell function in the male. Few commercial immunoassays of varying quality exist. Objective: To develop and validate a precise method for quantification of INSL3 in human serum by mass spectrometry. Methods: A method was developed to release INSL3 A-chain from the INSL3 A-B heterodimer by chemical reduction and alkylation. The alkylated INSL3 A-chain was quantitated by liquid chromatography-tandem mass spectrometry (LC-MS/MS), as a substitute for serum INSL3. The method was compared to a validated and sensitive in-house serum INSL3 immunoassay using 97 serum samples from 12 healthy boys during the pubertal transition. Adult levels were determined based on sera from 72 adult healthy males aged 18–40 years. Results: An LC-MS/MS assay with a limit of detection and limit of quantification (LOQ) of 0.06 and 0.15 ng/mL, respectively, and intra-assay CVs <9% in the relevant ranges was obtained. The LC-MS/MS compared well with the in-house immunoassay (Deming regression slope: 1.28; Pearson correlation: R=0.86). INSL3 concentrations increased with pubertal maturation in healthy boys. INSL3 concentrations were above the LOQ in all samples from the adult men. The mean (±2 SD range) for serum INSL3 concentrations in the adult men was 2.2 (0.5–3.9) ng/mL. Conclusions: A robust and sensitive method has been developed suitable for quantitation of serum INSL3 in a clinical setting using LC-MS/MS instrumentation available in modern clinical laboratories.

Keywords: Assay development, Insulin-like factor 3 (INSL3), Mass spectrometry

P26

Treatment of Dengue with Herbal Medicine Approach

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Dengue causes flu-like symptoms and lasts for 2-7 days. Dengue fever usually occurs after an incubation period of 4-10 days after the bite of the infected mosquito. High Fever (40°C/104°F) is usually accompanied by at least two of the following symptoms: headaches, pain behind eyes, nausea, vomiting, swollen glands, joint, bone or muscle pains, rash. Dengue is mainly transmitted by a mosquito (Aedes aegypti) and is distributed across all tropical countries. With no definitive treatment from modern medicine available, it is not surprising that many have turned to alternative therapies for relief.

Key words- Dengue, symptoms, mosquito, alternative therapies and medical management.
Herbal Medicine in Healthcare: An Overview
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Herbal medicine, also known as herbalism or botanical medicine, is a medical system based on the use of plant or plant extract that may be eaten or applied to skin. These medicines are the important part of healthcare throughout the world. Thus, herbal medicine has gradually gaining acceptance and can be considered the model of the future of healthcare.
Keywords: Herbal medicine, Healthcare, Ginseng, Standardization

Nutraceuticals and Their Effectiveness in the Management of Diabetes
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In the recent times, diabetes is quite common in all age groups including young adults. As per World health organization (WHO) around 422 million adults are living with diabetes globally. Considering the population affected by this condition there is need for safe agents that can reduce risk for diabetes in at-risk subjects. Although drugs such as glimepiride, metformin, poiglitazone, sitagliptin etc. have been used since a long time and they are proven effective in clinical studies for the treatment of diabetes. But all these agents produce some side effects on prolonged use. Nutraceuticals which have claimed to have health promoting, diseases preventing or medicinal effect on human health, also shown promising results in management of diabetes. Nutraceuticals include antioxidant vitamins, such as vitamins C and E, flavonoids, vitamin D, omega-3 fatty acids, conjugated linoleic acid, minerals like chromium and magnesium, alpha-lipoic acid, phytoestrogens, and dietary fibers.
Keywords: Nutraceuticals, Dietary supplement, Diabetes
P29
Homology Modelling and Structural Assessment of Human 4-Aminobutyrate Aminotransferase Enzyme
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Homology modeling forms a neat relationship between protein primary and secondary structure of a protein. We had done homology modelling of human 4-aminobutyrate transaminase also known as GABA transaminase or 4-aminobutyrate aminotransferase (ABAT) is a homodimer (of 50-kD subunits) protein catalyzes the degradation of gamma-aminobutyric acid (GABA), an inhibitory neurotransmitter in the central nervous system. Modeller 9v11 software was used for homology modelling. 50 models were designed and evaluated. Homology Sequence alignment of target and template sequences was performed to estimate the matches and similarity score by using Clustal W and t-Coffee. The similarity scores were calculated to be 98%, however the identities are also estimated to 98%. The structural assessment results were obtained to be 91% (Procheck), 91.7411 (ERRAT overall quality factor) and 87.64% (verify3d) for a broad study of the proteins. Further Modeval was shown excellent quality of the model. The results were found to be RMSD (2.719), Native Overlap (0.912), z-Dope (-1.191), z-pair (-14.129), z-surf (-10.917), z-combi (-18.294).

P30
Effects of Aqua-aerobic Exercises on Cardiovascular Fitness and Weight Loss among Obese Persons
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Evidence revealed that aquatic exercises are safer than land-based exercises and it allows increased movement amplitude and energy expenditure for obese, middle-aged, or elderly people, it is important to ascertain the physiological effects of aqua aerobic exercise on health among the obese persons. This study aimed to determine the effects of aqua aerobics exercise on cardiovascular fitness (VO2max and resting HR) and weight loss (weight, BMI, and WHR) among obese persons. Aqua aerobics exercise as a favorable exercise environment for the obese can be advised such a significant intervention strategy for weight loss and improvement in cardiovascular fitness.
Keywords: Aqua aerobics exercise, Weight loss, Resting HR, WHR, Cardiovascular fitness, Obese
P31
Therapeutic effectiveness of pulsed electromagnetic field in oncology
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Cancer is one of the most common causes of death worldwide. Available treatments are associated with numerous side effects and only a low percentage of patients achieve complete remission. Therefore, there is a strong need for new therapeutic strategies. In this regard, pulsed electromagnetic field (PEMF) therapy presents several potential advantages including non-invasiveness, safety, lack of toxicity for non-cancerous cells, and the possibility of being combined with other available therapies. Indeed, PEMF stimulation has already been used in the context of various cancer types including skin, breast, prostate, hepatocellular, lung, ovarian, pancreatic, bladder, thyroid, and colon cancer in vitro and in vivo. At present, only limited application of PEMF in cancer has been documented in humans. In this article, we review the experimental and clinical evidence of PEMF therapy discussing future perspectives in its use in oncology.

Keywords: PEMF, Oncology, Cancer, In vitro, In vivo

P32
Therapeutic Approach towards the Movement Disorders
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Background: Parkinson disease (PD), tremor, tics and dystonia, are the mainly conditions included in the movements disorders. The clinical scenario of the movement disorders is complex, often variable, and sometimes even bizarre. Objective: This review paper covers the diagnostic process for the common types of movement disorder and recent therapeutic challenge in treatment of the movement disorders. Methods: The material of review paper has been collected from the literature study of journals and books Results: Establishing the right diagnosis of the above movement’s disorders can be difficult. So, exact recognition can be based on the clinical acumen which is important for the several reasons. A systematic approach is suggested when clinicians diagnose the patients who present with one or more types of movement disorder. Two main categories of movement disorder phenomena can be distinguished, with several specific subdivision such as akinetic–rigid disorders and hyperkinetic disorders.

Conclusions: Thus, patients suffering from movements disorders have significantly benefited from the development of new pharmacological treatments over time, many of these therapeutic approach have either not been completely effective or not well-tolerated over the long course of the disease.

Keywords: Parkinson, Movement, Disorders
P33
Herbal Cosmetics: Rising Trend in Cosmetology
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Eco-friendly, cost-effective and relatively safe herbal cosmetics have moved from the bottom line to the main stream with increased research in the field of traditional cosmetics. A rich wealth of medicinal plants is already available with India and can supply the global demand of herbal products. The word cosmetic was derived from the Greek word “kosmikos” meaning having the power, arrange, skill in decorating. The increased demand for the natural product has created new avenues for natural herbs and medicinal plants in the market of cosmetics. Products formulated through various permissible cosmetic ingredients to form the base in which one or more herbal ingredients are used to provide defined natural cosmetic benefits only, shall be called as “HERBAL COSMETICS". According to Drugs and Cosmetics Act, herbs and essential oils used in cosmetics must not claim to penetrate beyond the surface layers of the skin nor should have any therapeutic effect.
Keywords: Herbal cosmetics, Plant extracts, Anti-oxidants

P34
Mitochondrial Dysfunction: An Explorable Hypothesis in Depression Progression
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Major depressive disorder is a mood disorder that interferes with daily life. Major Depressive Disorder is characterized by one or more Major Depressive Episodes i.e., at least 2 weeks of depressed mood or loss of interest or pleasure in nearly all activities. In eukaryotic cells mitochondria are the cellular powerhouse and they also affects brain function through oxidative stress and apoptosis. In long-living and non-mitotic cells such as neurons, oxidative stress induced by over-production of mitochondrial ROS or impairment of the antioxidant defence results in a dysfunction of mitochondria and initiation of the cell death cascade. These cascades can be further explored with animal studies along with clinical trials to have new approaches to treat depression or potential anti-depressants.
Keywords: Mitochondrial dysfunction, Oxidative-stress, Potential anti-depressant.
P35

Synthesis and Characterization of N-Mannich Base Derivatives of Primaquine and O-Chloroisatin

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Aim: The present research work aims on synthesis and characterization of N-Mannich base derivatives of Primaquine and o-chloroisatin for the treatment of Cerebral Malaria. Material and methods: The N-Mannich base is chemical approach to make drug molecule more lipophilic and aids to cross Blood Brain Barrier. The synthesis and characterization of N-Mannich base derivatives of Primaquine and o-chloroisatin was done and the in vitro drug release study was performed by shake-flask method. Results: The synthesis and characterization of N-Mannich base derivatives of Primaquine and o-chloroisatin was done by using IR and 1H-NMR spectroscopic technique and the in vitro drug release study showed maximum increase in lipophilicity (as compared to Primaquine) with log P value of 5.27. Conclusion: The present study suggested that the synthesis of N-Mannich base derivatives of Primaquine o-chloroisatin will help in increasing the lipophilicity that will help the molecule to cross the Blood Brain Barrier for the treatment of cerebral malaria. Keywords: N-Mannich Base, Cerebral Malaria, docking, Primaquine, o-chloroisatin, Lipophilicity

P36

Traditional Drugs and Emerging Research to Combat Inflammation: An Overview

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To overcome the conditions of inflammation such as redness, swelling, heat, pain and loss of function, the Non-steroidal anti-inflammatory drugs (NSAIDs) have been used since long time as a well prescribed drugs. It is well documented that NSAIDs inhibit the cyclooxygenase enzyme which results in reduction of pain. The present overview reviews the traditional drugs for inflammation, highlighting the current trend for anti-inflammatory research. Keywords: Inflammation, NSAID, COX, cytokines
**P37**  
Preparation & Demonstration of Different Types of Pharmaceutical Dosage  
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Dosage form is rather recent and appears to be replacing the expression Pharmaceutical preparation. A dosage form of a drug is a product designed for administration to the body in the diagnosis or treatment of disease. Giving a proper dosage form to a drug is needed for administration of drug safely to the body without any destruction to drug or any harmful effect to body. Destruction to drug here means that some drugs become inactive or get destructs when given orally due to gastric acid. Sometimes some drugs affect gastric lining or mucosa and are not intended for oral use hence it should be changed to other dosage form, for example, Injections. One drug may have more than one dosage form for different route of administration. Knowledge of these is essential for successful prescription writing and achieving the maximal therapeutic response from a drug. Let us consider some of the most important dosage forms.

**Keywords:** Dosage form, administration, diagnosis

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**P38**  
Enzymes: As Penetration Enhancer for Transdermal Drug Delivery  
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Epidermal enzymes are seeking attention as a new class of penetration enhancers. Enzymes can act upon skin altering its integrity to increase the drug permeation. The pretreatment of skin with these enzymes shows a very good permeability for various drugs. Skin is composed of lipid bilayer having proteins in between them. So the chemicals (enzymes) which can interact with these lipids and proteins can acts as a good penetration enhancer. Phosphatidyl choline dependant phospholipase C is an example of such an enzyme which digests the skin lipids acting as barrier and creates pores through which drugs like benzoic acid, mannitol and testosterone can pass easily. The proteolytic enzyme papain has been investigated for skin permeation enhancing activity for antipyrin and indomethacin as hydrophilic and lipophilic model drugs respectively. The results obtained by the above enzymes explore a new pathway for enhancing transdermal drug absorption and demonstrate that enzymes remarkably regulate the drug absorption through the skin.

**Keywords:** Enzymes, Transdermal drug delivery, Penetration enhancer
**P39**

**Recent Advances and Challenges in Management of the Melas**

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**Background:** Mitochondrial myopathy, Encephalopathy, Lactic Acidosis, and Stroke-like episodes (MELAS) is a rare mitochondrial disorder. The common signs and symptoms comprised of headache, visual symptoms, altered level of consciousness and/or seizure, aphasia, gait ataxia, hemiparesis and psychiatric symptoms. MELAS is caused by a defect in one of the several mitochondrial genes. The condition can appear in every generation of a family and can affect both males and females. The causes of MELAS include NADH dehydrogenation, transfer RNA and Inheritance. **Objective** In this paper attempts have been made to discuss the pathophysiological aspects and treatment towards the MELAS. **Methods:** The latest references from the literature survey were explored. **Results:** There is no specific consensus approach for treating MELAS syndrome. **Conclusions:** Several supplementations, including antioxidants and cofactors, are being used in MELAS syndrome based on limited clinical trials. Therefore, particular insight into a promising management and therapeutic approach towards the prevention of MELAS syndrome is required for the future prospective of disease.  
**Keywords:** MELAS, Mitochondrial disorder, Stroke-like episode

**P40**

**Knowledge, Attitude and Practices among Students towards Personal Hygiene**

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Personal health refers to the wellness of the individual. While personal health care is provided to people those who are not able to take care of themselves. Personal Health is the ability to take charge of your health by making conscious decisions to be healthy. Children are more receptive to learning and are very likely to adopt healthy behaviours at a younger age. Keeping in mind the same, the present study was conducted to investigate Knowledge, Attitude and Practices of adolescent students of Gurgaon regarding personal hygiene and giving them intervention about the same. After the results analysis, intervention was done with the help of education programme in order to clear their doubts. It was observed that after intervention, students showed positive attitude towards such sessions.  
**Keywords:** Personal Hygiene, Sanitation, Health
P41

Attitude towards Yoga among College Students of Gurgaon
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Yoga is usually associated with body postures that helps us keep fit, yoga is in fact a mind-body practice, a genuine science of the human being, a complete system controlling all aspects of life. Yoga is derived from the Sanskrit word which means “Union”. It is an ancient discipline which brings balance and health in all dimensions of the individual (physical, mental, emotional and spiritual). Yoga has tremendous benefits as it is regarded as an effective method for improving health in addition to management and prevention of diseases. The goal of the study was to evaluate the attitude of college students towards yoga. For this purpose, 150 students in Gurgaon district of Haryana were taken as representative sample for the whole population. The session was quite fruitful as students came up with many queries regarding the same.

Keywords: Stress, Yoga, Discipline, Balance, Weight loss

P42

Therapeutic Approach towards the Alzheimer's Disease
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Background: Alzheimer’s disease (AD) is a progressive, irreversible neurological disorder that occurs gradually and results in memory loss, unusual behavior, personality changes, and loss of the ability to thinking. Objectives: This review paper covers the recent challenges towards the management of the Alzheimer’s disease. Methods: The material of review paper has been collected from the literature study of journals from internet such as science-direct, pubmed etc.

Results: Currently, the drugs approved by the FDA for the treatment of AD belong to cholinesterase inhibitors group which are rivastigmine, memantine and galantamine. They only help in slowing down the progression of diseases rather than treating it. The two therapeutic approaches to AD are the inhibition of neurodegeneration and the latter. Is to stimulate the regeneration of brain by enhancing neuronal plasticity and neurogenesis that results in the formation of functional neurons. The recent publications confirmed innovative therapies of drug approach to address neuroinflammation. Conclusions: AD needs great concern and new innovations so that its progress and onset can be delayed. The current knowledge of pathophysiology and previous scientific researches contribute to the ongoing novel therapeutic researches for AD treatment.

Keywords: Alzheimer's diseases, Neurological, Neuroinflammation
P43
Role of Protein Kinase Inhibitors in Cancer Therapy
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Protein kinase inhibitors are an important class of therapeutics that blocks the action of one or more protein kinase. Selective kinase inhibitors play a major role in preclinical target validation studies in drug discovery. Protein kinase inhibitors are useful in different type of cancer therapy where kinases are overexpressed due to mutational or protein conformational changes. The first protein kinase inhibitor approved by USFDA is imatinib and this inhibitor inactivates the kinase activity of BCR-ABL, the fusion protein that causes chronic myelogenous leukemia (CML). There are challenges in kinase inhibitor selectivity which is not fully explored and understood. We hypothesized the role of protein kinase inhibitors in cancer therapy and demonstrate the clinical impact of selective protein kinase inhibitors.
Keywords: Protein Kinase Inhibitors, Protein Kinase, Chronic Myelogenous Leukemia (CML), Imatinib, Clinical Trials

P44
Therapeutic Targets towards the Schizophrenia
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Background: Schizophrenia is a devastating worldwide illness that affects approximately 1% of the global population. Despite decades of research, its pathophysiology still remains an enigma, and virtually all neurotransmitter systems have been implicated in the etiology of this disease. Objective: This review paper summarize the recent challenges in management of the schizophrenia and imply how these recent discoveries may lead to possible development of effective therapies. Methods: The material of review paper has been collected from the literature study of journals from the sciencedirect, pubmed etc. Results: Schizophrenia is a chronic mental heterogeneous syndrome which shows symptoms like hallucinations, delusions and Impaired psychosocial functioning. Conclusions: Hence by understanding the diagnosis, pathophysiology and treatment of schizophrenia lead to more novel discoveries related to the psychiatric diseases treatment.
Keywords: Schizophrenia, Nuerotransmitter, Transmission
P45
Nutraceuticals as a Natural Supplement to Fight Depression
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Depression is second leading cause of long-term disability throughout the world. Despite the availability of different classes of antidepressant drugs, most of them are not completely effective and above all are associated with many serious adverse effects. Beyond the side-effect liability of the anti-depressants, there is a recognition and extensive research documentation that many depressed patients do not recover well-functioning. Amongst the natural compounds that show antidepressant activity, green tea catechins, anthocyanins, aglycons have been shown to decrease depressive symptoms in animals by inhibiting monoamine oxidase enzyme. Procyanidins, the main component of Cocoa extract found to attenuate depressive symptoms in rats. Trans-resveratrol also possesses MAO-A inhibitory effects in brain. Hence, these Nutraceuticals are proving potential futuristic approach to cure several diseases like depression without having any adverse effects.

**Keywords:** Nutraceuticals, Antidepressant activity, Herbal remedies, Dietary supplements, Diseases.

P46
Anxiety: Herbs as Treatment
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The prevalence of psychiatric disorders such as anxiety is very common and has been affecting many people from all around the world. Over past many decades, many synthetic pharmacological products/drugs are available in the market to cure the disorder, also pertaining to various adverse reactions or side effects which cause discomfort and sometimes other disorders to the patients.

For example, kava, with greater benefits than harm is used in mild to moderate anxiety. Inositol has been used in patients with panic disorder or obsessive-compulsive disorder (OCD). Various other potential herbal medicines with in vitro and in vivo evidences are currently under research. Variety of herbal drugs or supplements can be developed by following the strategies that minimizes the risks and maximize health benefits.

**Keywords:** antianxiety medicines that calm and relax people with excessive anxiety, Kava crop of the Pacific Islands, Herbs plants with medicinal purposes
P47
A Review on Prescribing Pattern in Health Care
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Background: Rational use of drug means delivering the medication on time for right duration and in right dose. WHO prescribing indicators measures the performance of health care provider in five key areas related to the appropriate use of medicine. Objective: Aim of the study is to improve prescribing pattern of drug according to WHO prescribing indicators in hospital. Methods: Prescribing indicator is an important tool in rational prescribing of drugs. Prescribing of drug in prescription first consider the patient diagnosis. This gives an idea to physician about the patient need of medication. Result: In study average number of drug, percentage of drug from EML, Percentage of drug by generic name, percentage of encounter with antibiotic, percentage of injection prescribed was found to be high. Conclusions: The study shows that the physicians do not adhere to the prescribing guideline made by the regulatory agencies leading to irrational use of drug. This led to treatment failure, antibiotic resistance unnecessary economic burden over patient.

Keywords: Rational use, WHO indicators.

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How Hypoxia and Ischemia Affect Liver Cells
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The liver is the central organ that metabolises excessive nutrients for storage in the form of glycogen and lipid, and supplies energy producing substrate to the peripheral tissues to maintain their function even under starved conditions. The process requires considerable amount of oxygen, which causes a steep oxygen gradient throughout the hepatic lobules.

Keywords: FLD, HIRI, Cancer, Hepatitis C, Hypoxia
Cryopreservation of Stem Cells: Boon or Bane
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Stem cell transplantation signifies a crucial method for the treatment of many malignant and non-malignant ailments. The basic role of stems cells from the umbilical cord is to treat diseases with autologous stem cells along with cellular therapies and regenerative medicines. Haematopoietic stem cells and mesenchymal stem cells originated from bone marrow have been the study of both laboratory and primitive clinical studies. These cells must be collected at primary stage as they are not applicable when matured. Secondly, stem cells have minimal chances of auto rejection by the body and are considered to be economical as compared to donor stem cells. Although these cells display both multipotency and expansion potential, they do not produce balanced cell lines in culture which are expected to control the breadth of their application in the domain of reformative medicine. An important pre-requisite for the commercial and clinical use of stem cells are accurate cryopreservation protocols for durable storage. This article analyses the modes of cryopreservation and the current status of preservation of hematopoietic and mesenchymal stem cells and inspect the use of allogeneic stem cells for the treatment of many malignant and non-malignant diseases.

Keywords: Stem cell, Cryopreservation, Haematopoietic stem cells, Mesenchymal stem cells

Biosimilars: Present Status and Future Perspectives
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Biosimilars are biotic products that are the simulations of their visionary biopharmaceuticals. These are established after clear expiration of innovator biopharmaceuticals and are submitted for discrete marketing approvals. In view of the structural and manufacturing difficulties of biopharmaceuticals, biosimilars should not be regarded as “biological generics”. These are relatively exceptional molecules with restricted data at time of approval, so there are apprehensions about the safety and efficacy of biosimilars. This article analyses and clarifies the current status and future perceptions of biosimilars.

Keywords: Biosimilars, Biopharmaceuticals, Biologic Generics, Current Status, Future perceptions
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Current, Potential Diagnostic and Therapeutic Techniques Associated with Diabetic Cardiomyopathy
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The preponderance of diabetic cardiomyopathy globally is an event of angst and apprehension. This cardiac complication silently develops in the earlier phases, can provoke cataclysmic effects during prognosis. According to a recent epidemiological study, the prevalence of diabetic cardiomyopathy in patients suffering from diabetes mellitus is 12% and 22% (in sexagenarians). The present clinical treatment comprises strain rate imaging and tissue Doppler imaging of the left ventricle to detect left ventricle diastolic dysfunction. Alteration of expression of miRNA is achieved by matrix metalloproteinases (MMPs) which further corroborates to progressive cardiac rehabilitation. Incompetence and inadequacy of the present-day clinical treatments and regimens for diabetic cardiomyopathy emanates the sine qua non for the creation of medicines and related treatments of natural origin which could evoke all the pharmacological actions demonstrated by their chemical alternatives. The Chinese herbs are the benign superlatives in the clinical treatment of diabetic cardiomyopathy. They have demonstrated and established the necessary properties, for prevention and cure. Chinese herbs have the potential and possibility to be an active realm in the field of clinical medicine and treatment favorable for mankind.
Keywords: Natural origin, Prognosis, Fluid accumulation, Biomarkers, Herbs, Diabetes

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Evaluation of Anti-Arthritic Potential of Eclipta protrata
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The current study involves the exploring of anti-arthritic potential of chloroform extract of Eclipta prostrata in rats using CFA induced arthritic model. The arthritis was induced by injecting 0.1 ml of CFA in the sub-plantar region of left hind paw on day one. The chloroform extract was administered in rats of either sex at a dose of 100 mg/kg and 200 mg/kg for 21 days. For evaluating the anti-arthritic potential of the extract various parameters was used viz. behavioral, biochemical, histological and radiographic studies. The chloroform extract exhibit the significant anti-arthritic activity. The extract at a dose of 200 mg/kg showed marked decrease in paw volume as well as paw diameter. The improvement in the count of hemoglobin and white blood cells also indicates systemic concert of the drug. Moreover the resolving of radiographic lesions was observed in the treatment group. The results obtained from current study showed that chloroform extract at a dose of 200 mg/kg shows effective anti-arthritic activity.
Keywords: Arthritis, Eclipta prostrata, CFA
P53
Sirtuins, a Promising Target in Slowing Down the Ageing Process
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Sirtuins are a group of proteins that contains either mono ADP–ribose transferase or deacylase activity including deacetylase, desuccinylase, demalonylase, demyristoylase activity. Sir2 is derived from yeast gene ‘silent mating-type information regulation 2’. Dietary replacement of polyphenols like flavones, stilbenes, chalcones and anthocyanidins may protect against neurodegenerative, cardiovascular, inflammatory, metabolic diseases and cancer by increasing SIRT1 activity. Curcumin enhances longevity indirectly by increasing levels of SIRT1, SIRT3, SIRT5, SIRT6, SIRT7. A compound name resveratrol enhances SIRT1 activity and it gives same benefits for increasing mitochondrial activity and metabolic control. Niacin and Nicotinamide riboside are variants of vitamin B3 which are present in small amounts in broccoli, cabbage, tomatoes, raw beef and shrimp. They raise levels of NAD+, which in return increase SIRT1 levels. Preliminary studies with resveratrol have led some scientists to speculate that resveratrol may longovate life.
Keywords: Sirtuins; lifespan; neurodegenerative; metabolic disorders; cancer

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Can Herbal Formulations Be the Breakthrough for Dengue Cure?
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Till day, there are no precise internationally accepted cures for dengue fever in any classification of medicine. Preparations and formulations based on plants have also been tried and used by traditional doctors and at the same time being scientifically confirmed and recognized by modern researchers. The search for new anti-dengue agents from medicinal plants has assumed more urgency than in the past. Himalayas is used in traditional medicine to treat numerous ailments such as liver disorders, malaria, and diabetes and are testified to have a extensive spectrum of pharmacological properties. The extensive range of medicinal usages comprise the treatment of chronic fever. Swertia chirayita has also not been scientifically proven to treat dengue but it does help in chronic fever.
Keywords: Dengue, Azidarachta indica, DENV-2, Carica papaya, Swertia chirayita, Anti-dengue agents.
Background: Fibromyalgia is characterized by pain and generalized tenderness, often accompanied by fatigue. The prevalence rate of Fibromyalgia is 1-3% and the origin is unknown. This review article aims to summarize the effects of diet in combination with physiotherapy for women with fibromyalgia. Objective: To study the effects of diet and physiotherapy in case of women with Fibromyalgia for intervention of low back pain and body composition. Method: Various articles have been reviewed from Google Scholar to study the efficacy of diet in combination with physiotherapy in women with Fibromyalgia. Results and Conclusions: Various researches have demonstrated that Lactovegetarian diet and core stability exercises in physiotherapy results in reduction of pain in low back and improved body composition. Keywords: Fibromyalgia, Tenderness, Fatigue

Pegan Diet: A Hybrid Nutritional Philosophy And Its Potential Health Benefits

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Pegan diet is a combination of Paleo and Vegan diet. Paleo diet also known as caveman diet is a diet based on types of foods presumed to have been eaten by early humans. Vegan diet consists of vegetables, vegetable oils and seeds excluding all food of animal origin. It includes combining the best parts of both the diets. The best part of this diet is that it is less restrictive and more sustainable. It helps to eliminate the processed foods from daily diet. Processed foods are the major contributors to obesity and illness. Pegan diet emphasizes nutrient rich fruits and vegetables and healthy unsaturated fats. This hybrid diet helps in weight management and in keeping oxidative stress at the minimum. It also helps to manage cholesterol, blood pressure and other heart related functions. Pegan diet incorporates the healthiest elements of both the diets and it is an overall good eating strategy. Keywords: Pegan diet, Paleo diet, Vegan diet, Eating strategy
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Pharmacist’s Job Satisfaction in India and Abroad
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In India there are over 7 lakh registered pharmacists who are practicing at both community and hospital pharmacies. Here pharmacists are not considered as part of government's health and pharmaceutical policies. PCI guidelines which are adopted by India and the Vision 2020 emphasize on highest professional and ethical standards of pharmacy. Pharmacy programs offered in India are D Pharm, B Pharm, M Pharm, Pharm D and PhD. Minimum qualification to practice pharmacy is D Pharm. But if we compare condition of Indian pharmacists with pharmacists of developed countries then there is a huge difference in salary as well as professionalism, this condition need to change. Many reforms are needed to improve job satisfaction among Indian pharmacists such as higher salaries, more job opportunities in government offices, recognition of pharmacists as health care professionals and changes in the Pharm D and pharmacy curriculum. This needs to be addressed in future studies and curriculum development actions. These points give us brief about the current problems in the pharmacy profession in India and provides suggestions to improve job satisfaction of a pharmacist in India.
Keywords: Pharmacy, Satisfaction, Recommendations

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Nutraceuticals in Health Care: An Overview
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Nutraceuticals are the food or part of the food that has health benefits to humans including prevention or treatment of a disease. In this article, we describe the importance of nutraceuticals and their usage in treatment or prevention of certain diseases or ailments. Now-a-days phytonutrients and health promoting foods has received extensive attention of the human beings because of their changed lifestyle. People have started taking more dietary supplements, nutraceuticals and phytotherapeutic substances to achieve better quality of life. Nutraceuticals can be categorized as prebiotics, probiotics, mineral supplements, vitamins, dietary fibres, health drinks, antioxidants and polyunsaturated fatty acids. Moreover, they also help in combating several diseases including cancer, diabetes, cardiovascular diseases, arthritis and inflammation etc.
Keywords: Nutraceuticals, Health benefits, Probiotics, Prebiotics, Cancer, Diabetes
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Perspectives on Effect of Ketogenic Diet on Type 3 Diabetes Induced Alzheimer’s Disease
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Type 3 diabetes is a term used when Alzheimer’s disease is generated by insulin resistance in the brain. This disorder is most often used to define people who have type 2 diabetes and are also detected with Alzheimer’s or dementia. This term is proposed by researchers because of the common molecular and cellular aspects among Type-1-Diabetes, Type-2-Diabetes and insulin defiance linked with memory loss and cognitive failure in old people. These investigations are supported by numerous vital biological studies that translate the impact of insulin in the pathology of AD through convinced mechanisms. The aim of this review article is to confer the cellular and molecular influences between diabetes and AD for labelling Type-3-Diabetes and also this review sheds light on the benefits of natural remedies such as lifestyle changes including ketogenic and low carb diets for treating type 3 diabetes and Alzheimer’s disease.
Keywords: Alzheimer's Disease, Low Carbohydrate Diet, Type 3 Diabetes

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Hypoxia and Ischemia as a Cause of Cancer
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Cells of different tissues essentially require oxygen to generate energy and perform metabolic functions. Deficiency of oxygen or hypoxia results in failure to carryout these activities by the cells. Hypoxia may be classified as either generalized, affecting the whole body, or local, affecting a region of the body. There is no doubt that cancer is caused due to prolonged irritation caused in normal cells due to irregular functional activity of normal cells. As hypoxia and ischemia intervals get intense and prolonged, these conditions lead to cell irritability and eventually result in cancer. Both because of atherosclerosis and associated to anatomical variants of the arteries in the affected zone.
Keywords: Hypoxia, Ischemia, Cancer, Exogenous, Anatomical
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Infant Hypoxic-Ischemic Encephalopathy  
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Hypoxic ischemic encephalopathy (HIE) is a brain dysfunction that occurs when an infant’s brain doesn’t receive enough oxygen (hypoxia) and blood (ischemia). Encephalopathy refers to any condition that results from reduced blood and oxygen supply to the brain. The common symptoms associated with HIE include Low heart rate, Poor muscle tone, Weak breathing or no breathing, pale skin color, Excessive acid in the blood etc. Tests to confirm HIE are: CT scan, MRI scan, echocardiography, and ultrasound. The conditions of HIE vary, depending on whether the infant has mild, moderate, or severe symptoms. Babies with mild symptoms can have a life uninhibited by HIE, whereas babies with severe symptoms may have a shortened lifespan with a number of painful problems. Effects of HIE may include developmental delays, cognitive issues, motor skill development delays, and neurodevelopment delays.  
Keywords: HIE, Antrapartum, Intrapartum, Postpartum, Neonatal  

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Herbal Pharmacovigilance: Current State and Future Directions  
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Currently, a number of herbal medicines or herbal products lead to adverse effects due to their improper use or improper quality of medications. This is the result of poor pharmacovigilance of the herbal products. Inadequate regulatory measures, weak quality control systems, and largely uncontrolled distribution channels lead to the occurrence of such events. In order to expand the knowledge about genuine adverse reactions to herbal medicines, and to avoid wasting scarce resources for identifying and analyzing adverse events, events resulting from such situations will need to be reduced or eliminated so as to improve the quality of these medications and reporting of the adverse events. Member States of the World Health Organization (WHO) are encouraging concerned organisations to strengthen their regulations, registration and quality assurance of herbal medicines. For implementation of the same, the national health authorities need to give greater focus to educate consumers and to qualified practitioners regarding the provision of herbal medicines.  
Keywords: Guidelines, Herbal medicines, Pharmacovigilance, Regulatory
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**Recent Approach and Advancement in the Treatment of Migraine**

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**Background:** Migraine is a common and highly disabling neurological disorder which is associated with a high socioeconomic burden. Despite being one of the most common disabling primary headaches. **Objective:** This review paper covers the diagnostic process for migraine and recent therapeutic advancement in the treatment of migraine. **Methods:** The material of review paper has been collected from the literature study of journals from the sciencedirect, pubmed etc.  

**Results:** The range of available acute treatments have increased over time. Recently, there have been major advances in the diagnosis and treatment of Migraine management across the world. There are the Migraine’s abortive and prophylactic medications, based on their pharmacological category, citing their recommended doses, efficacy and side effects. At present, abortive Migraine therapy can be classed as specific (ergot derivatives and triptans) or non-specific (analgesic and non-steroidal anti-inflammatory drugs). **Conclusions:** Thus, the drugs used in the development with novel mechanism of actions and focused on the therapeutic targets for the treatment of Migraine is required.  

**Keywords:** Migraine, Acute treatment, Diagnosis, Chronic treatment

**P64**

**Plumbagin from Genus Plumbago: A Review**

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**Background:** Plumbagin (5-Hydroxy-2-methyl-1,4-naphthaquinone) is isolated from different species of Genus Plumbago. Literature revealed that high amount of plumbagin found in the roots of *Plumbago zeylanica* and *P. indica*. **Objectives:** Plumbagin has a diverse role in the treatment of various disorders such as cancer, ulcer, diabetes, malaria and cardiovascular etc. This review complies different ethnobotanical and traditional uses on Genus Plumbago and various pharmacological activities of plumbagin. **Methods:** Data on selected topic have been compiled from Pub Med, Research Gate, Science Direct, Chemical Abstract and Google Scholar.  

**Conclusion:** In this study, we have concluded that high amount of Plumbagin can be isolated from *Plumbago zeylanica* and *P. indica*. It has a potential effect in the inhibition of intestinal carcinogenesis, inflammation and as a neuroprotective against cerebral ischemia.  

**Keywords:** Plumbagin, Cancer, Inflammation, Plumbago, Traditional roles, Chemistry
P65
Plant Based Green Synthesis of Silver Nanoparticles: A Review
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Background: The present study reveals the plant based synthesis of silver nanoparticles which has been widely accepted due to its advantages over other methods such as cost effectiveness, environment friendly, less equipment used, highly stable and non-toxic. The literature suggests that plants in the form of extract have been used as a reducing, capping, and stabilizing agent to synthesize the silver nanoparticles. Objectives and methods: Objective of this review is to provide a concise and informative data. Data on “A Review on Plant Based Green Synthesis of Silver Nanoparticles” compiled from Pub Med, Research Gate, Science Direct and Springer.

Conclusion: The present review provides the current status and challenges of plant based green synthesis of silver nanoparticles. It also highlights the potential of green alternatives over the toxic and hazardous chemicals. The data also highlights the advances and role of plant based silver nanoparticles in pharmaceuticals.

Keywords: Green Synthesis, Plants, Silver nanoparticles

P66
Zika Virus: A Statistics Based Study on Its Pathogenesis and Treatment
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Zika Virus, a mosquito borne disease, is a member of the virus family Flavivirus. Adese mosquitoes are responsible for the spread of the disease. Zika was first isolated in rhesus monkeys in 1947 and the term zika was based on Zika forest in Uganda. Zika virus family belongs to the dengue virus, yellow fever virus and west nile virus. It was alarming in 2015 when it reached to Brazil and later to entire America. 1.3 million People have been affected in Brazil alone and later many countries have reported local transmission of the virus during 2016 through air travel and international trade. Zika virus infections were characterized by following symptoms; Mild influenza-like illness, Guillain-Barre syndrome in adults and microcephaly in babies born to pregnant infected mothers. Zika virus infection has neither effective treatment nor any vaccine so the primarily focus is to prevent infection. Though the awareness is growing among the people for the virus, still research needs to be carried out to answer many questions like virus’s vector, pathogenesis and treatment. These questions draw a special attention for research to optimized patient health management and prevention of this emerging pathogen.

The objective of this review is to provide case statistics, scientific evidence that contributes to the care, planning and implementation of public health management.

Keywords: Zika Virus, Flavivirus, Dengue, Pathogenesis
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**In silico Approach: Prominent Tool in Drug Discovery**

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The process of drug discovery is very intense and interdisciplinary effort for designing of potent drug. In silico methods play apparent role in discovery of drug and its development process. In-silico designing of drug can be used in all phases of drug evolution from the preclinical phase of drug discovery to late phase of clinical development. Crucial role of in silico approach in drug development includes virtual screening, ADMET prediction, procedures for determining protein-ligand binding. Various tools used for obtaining potent leads comprise molecular docking, programs of homology modeling, molecular dynamics, development of pharmacophore, quantitative structure activity relationship descriptors. Ample range of softwares are available that can be used in in-silico designing of drug. Thus, in silico study would be a compendious index to determine drug-likeness of the chemical entity, and might be useful for researchers to choose proper drug candidates for further drug development.

**Keywords:** ADME, Computational, Drug, In silico

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**Effect of Oil Used for Cooking on Health of Students at SoMAS, GDGU**

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**Background:** Healthy diet plays an important role in a healthy life. Oils are used to prepare various dishes like vegetables, omelet, daal, poori, paratha etc. The composition, adulteration, and reuse of oil for cooking affects human health. Reuse of oil results in a large intake of oxidized radicles that harms the body and alter metabolism. Increased consumption of oil may result in hyperlipidemia, obesity, atherosclerosis etc. **Objective:** The objective of the study was to find out the effect of nature, volume, and reuse of oil on human health. **Methodology:** A questionnaires-based survey was conducted to gather the data from students of G. D. Goenka University. **Results:** The low consumption of oil, no reuse of oil results in the healthy life of peoples. The faculties taking care of low consumption of oily food and avoid oily food were found healthy.

**Conclusion:** It was concluded from the study that low oil consumption in food is better for health. The reuse of oil must be avoided because it may impact obesity and other health issues.

**Keywords:** Life, Food, Health, Diet, Oil, Fast food
P69

Updates on Pharmacological Potential of Natural Component: Oleic Acid
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Oleic acid is a monounsaturated fatty acid and natural constituent of a number of foods, particularly vegetable oils. There are beneficial health effects of oleic acid when used as ingredient in processed functional foods. It is firmly accepted that by changing saturated fats in the diet with oleic acid accords the maintenance of normal blood cholesterol levels, and other effects including the modulation of inflammatory markers, blood pressure, insulin sensitivity, gastrointestinal functions and even various cancers. These findings are morally supportable when such potential effects are proved using standards and trials to human health. The studies evaluating the health effects of oleic acid are done using vegetable oils which may also contain other fatty acids and constituents. The possibilities of using oleic-acid-related health state on foods are displayed here.

Keywords: Health effects, inflammatory markers, Insulin sensitivity, Oleic acid

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Lifestyle of Faculties Vs Good Habits at SoMAS, GDGU
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Background: The heavy workload on employees results in lack of rest, sleet and disturbance in quality of lifestyle. Use of electronic gadgets, nature of job, coordination of staff members, challenges in teaching, adaptation of new teaching methodology etc., results in a bit discomfort to faculties. Generally, persons degrade their life pattern that results in health issues like obesity, blood pressure, diabetes, cervical, migraine etc. Objective: The purpose of the study was to find out the effect of good habits like on health status and efficiency of faculties in their route in the job. Methodology: A survey based activity was performed using questionnaires about the health status of faculties in the Department of Pharmacy, SoMAS, GDGU in order to gather the data. Result: The 14% faculties have low BP, 68% have normal BP, 14 % have high BP and 5% were hypertensive, 44% faculties were overweight and 55% faculties were healthy. It was concluded that faculties who wake up early in the morning and do regular exercise showed better health status. Conclusion: It was concluded that early wake-up, regular exercise etc results in a healthy life of professional faculties.

Keywords: Life, Professional, Health, Habits
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Dosage Adjustment in Obese Pediatric Patients Using Various Descriptors
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Background: Excess weight in childhood manifests itself as a risk factor for various disorders which emphasizes the need for taking the weight of pediatrics under consideration. Objective: The main objective is to prevent drug related toxicity in obese pediatric. Method: Various published articles were assessed from past 10 years, i.e. 2003-2010 and presumed that obesity is calculated using height (m²) and weight (kg) to find body mass index (BMI). This index is compared to the standard percentile specified in WHO. Overweight is a BMI above the 85th percentile to below the 95th percentile, while obese is greater than or equal to 95th percentile. Conclusion: It is concluded from the study that total body weight (TBW) and ideal body weight (IBW) are satisfactory descriptors for obese patients in pediatrics. Utilization of these descriptors allows for better pharmacokinetic and pharmacodynamics control of drugs in this age group and helps to enhance safety and ensure optimal therapy. Keywords: Obese, Paediatric, Body mass index, Dosage adjustment

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Therapeutic Drug Monitoring: An Approach in Maintaining Drug Efficacy and Preventing Toxicity
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Background: Therapeutic Drug Monitoring is a measurement of plasma concentration of drugs with specific narrow therapeutic range at particular marked intervals in the blood. TDM is mainly done to avoid both sub-therapeutic and overly toxic dose. Objective: The main objective is to enhance the drug efficacy and minimize its side effects thus preventing dose related toxicity. Method: Various published literatures and articles were assessed from past 10 years, i.e. 2008-2018 to evaluate the importance of TDM on drug safety and efficacy through combination approaches of pharmaceutical, pharmacokinetics and pharmacodynamics techniques. Conclusion: TDM plays an important role in the development of safe and effective therapeutic medications and individualization of medications thus may be used to adjust the dose and provide the safest approach for optimal drug therapy with minimal toxicity. Keywords: Therapeutic drug monitoring, Narrow therapeutic range, Pharmacokinetic variation
A Contribution of a Healthy Diet on the Lifestyle of Faculties at SoMAS, GDGU

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Background: The balanced diet plays an important role to maintain healthily and prolong life. In a race of job to fulfill the targets/assignments, the mismanagement of time is very natural that results in compromise/escape of diet, consumption of fast food, addiction of celebrities, tea, coffee, alcohol, tobacco etc. Objective: The objective of the study was to find out the effect of diet on human health. Methodology: The study was based on a survey about diet taken by professional faculties in the Department of Pharmacy, SoMAS, GDGU. The questionnaires were prepared and circulated to gather the data. Result: The low consumption of spicy, fast food, oily diet results in the healthy life of most professionals. The faculties taking care of balanced diet in their meal were found healthy and fit. Conclusion: It was concluded from the study that daily consumption of protein and carbohydrate-rich diet results in a constant supply of energy in faculties. It was postulated that due to lack of regular vegetables/fruit intake in diet might faculties feel tiredness due to lack of enzyme and cofactors provided by vegetables/fruits.

Keywords: Life, Food, Health, Diet, Meal

A Pharmacist’s role in tackling abuse of over the counter drugs among youth

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Background: The Over the Counter (OTC) Drugs or non-prescription drugs can help individuals for self-treatment without a physician consultation. Objective: The objective is to explore and determine the perception of tackling the abuse of OTC drugs among the youth by pharmacists. Method: Various published literatures and articles were assessed from past 10 years, i.e. 2008-2018 to gain more insight about the non-prescription drug misuse among youth. Conclusion: It was concluded that the pharmacists should take mindful steps and be alert while supplying medicines, either prescription drug or non-prescription drug and know their potential to be misused. The public needs to be educated that non-prescription drugs also have the potential to be misused.

Keywords: Over the Counter Drugs, Pharmacists, Medication Abuse, and Youth
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Green Chemistry: Boon over Conventional Synthesis

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Green chemistry working on its twelve principles uses less toxic starting materials and revolutionized chemical synthesis. Reaction times in the best cases have been reduced from hours or days to minutes. Short reaction time, wide range of reactions, minimum exposure of hazardous chemicals and maximum utilization of energy; these features enables microwave assisted synthesis an effective and handy tool for industry as well as academic research. It has also provided the momentum for many chemists to switch from conventional heating method to microwave assisted chemistry. It is rapidly becoming the method of choice in modern chemical synthesis and drug discovery.

Keywords: Microwave heating, Green chemistry, Microwave synthesis, Microwave

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Assessment and Prevention Complications of Iron Replacement Therapy: Clinical Pharmacist Approach

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Background: Deficiency of Iron and particularly iron deficiency anemia (IDA) can lead to negative health consequences. In this review describes the importance of adherence and persistence (adhering to treatment for the recommended duration) with iron replacement therapy in the prevention of complications, particularly regarding its recommended dosing schedule. Method: Comprehensive literature searches were performed of Medline and the Cochrane library from 2000-2018. Demographic and clinical characteristics were evaluated for association with hemoglobin response at multiple time points. Result: Identified articles focused on IDA as a risk factor (particularly for worsened comorbidities or surgical outcomes), adherence, persistence and differences between iron formulations. Current guidelines and expert opinion continue to support oral iron supplementation as first-line therapy. Whereas it is recommended to take iron therapy for 2 months to normalize the hemoglobin, then 2-3 months to build up iron stores, many more patients face difficulties in adhering to and persisting with the full iron treatment regimen. Iron therapies appears to be facilitated by using ferrous sulfate due to its optimal absorption, and particularly extended-release forms due to their improved tolerability for iron deficiency. Conclusion: Proper adherence and persistence with iron supplementation may prevent or reduce the risk of complications of iron deficiency and IDA.

Keywords: Iron preparations, Iron deficiency anemia, Iron replacement therapy
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Antimicrobial Resistance
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There is a growing problem of antibiotic resistance. It happens when bacteria change and become able to resist the effects of an antibiotic. Each time you take antibiotics, sensitive bacteria are killed. But resistant germs may be left to grow and multiply. They can also cause infections that certain antibiotics cannot cure. Data from low income and middle income countries indicate that, because of the development of resistance to first line antibiotics, 70% of hospital acquired neonatal infections could not be successfully treated by using WHO’s recommended regimen.

Keywords: Regimen, Pneumonia, Salmonellosis, Neonatal, Enterobacteriaceae, Pseudomonas

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Role of Antioxidants in Rheumatoid Arthritis
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Rheumatoid arthritis (RA) is a chronic autoimmune disorder that primarily affects joints. The exact cause of the disease onset is unknown but a thesis regarding exposure of individuals genetically susceptible to the disease has been proposed which states that subjects with HLA-DR, PTPN22 alleles and PADI4 are more disease prone. Various other environmental factors like smoking, exposure to bacteria and viruses also precipitate disease conditions in addition to inflammatory cytokines and matrixmetalloproteinases and excessively produced free radicals. The production of reactive oxygen species (ROS) and free radicals is inevitable in animal cells. Normally an equilibrium is established between the formation of ROS and defense antioxidant mechanisms and disturbances in this mechanism produces oxidative stress which can injure the cellular components like proteins, cell membrane and DNA causing cell death. Thus, a preventive role of antioxidant supplementation or intake of natural dietary antioxidants in RA patients is suggested.

Keywords: Rheumatoid arthritis, Antioxidant, Free radicals, Tissue damage, Matrix metalloproteinases
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Medication Adherence in Patients with Bipolar Disorder
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Background: About one-third of persons with bipolar illness take less than 30 percent of their medication and because nonadherence is associated with rehospitalization and suicide, the literature was searched to identify controlled studies of improvement of treatment adherence among persons with bipolar disorder. Method: All such articles were manually searched to locate any further articles containing relevant information. Result: The medication-related factors such as type of medications, doses, treatment regimens and side effects did not demonstrate consistent associations with non-adherence. Conclusion: An adherence to treatment for bipolar disorder may be enhanced by interventions that address the issues of appropriately taking medications to manage illness. For ideal results, the promotion of adherence must be integrated into the medication management of bipolar illness.

Keywords: Adherence measurement, Psychosocial interventions, Psycho-education

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Food Fallacies in India: A Review
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Food fallacy is a myth about the consumption of certain foods. Fallacious beliefs concerning food are highly prevalent in India. People blindly trust the fallacies and have a tendency to change their perspective accordingly. Most of these fallacies are passed on from generation to generation, unquestioned. Coincidental malady preceded by eating a particular food or food combination is also responsible for giving rise to some of the food myths. Some commonly observed dietary misconceptions prevailing in India have been discussed in this review. Fallacies such as eating at night will make you fat, chocolate causes acne, banana is fattening, starve yourself to lose weight, skipping breakfast helps to lose weight etc. brainwash the youth. The fallacy about skimmed milk is that it has little nutritive value though it is whole milk with just butterfat removed and remains a superior food with all its protein, calcium & vitamins. Food fallacies can affect the nutritional status of a community or a subsection within it. There is a need to eliminate food fallacies with time by understanding and realizing the facts and truth behind it.

Keywords: Food, Fallacy, Myth
**P81**

**Various Software Use in Drug Discovery**

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Drug discovery include drug designing and development, is a multifarious and expensive endeavor, where least number of drugs that pass the clinical trials makes it to market. Software based drug discovery and development methods have major role in the development of bioactive compounds for over last three decades. Computational approaches such as docking confer interaction of small molecules with structural macromolecules and thereby hit identification and lead optimization. These methods are faster, and accurately provide valuable insights of experimental findings and mechanisms of action. In addition, appropriate implementation of these techniques could lead to a reduction in cost of drug designing and development. Currently in biomedicine sciences, such software are exhibiting imperative role in the different phases of drug discovery. The review discusses working principle and successful applications of most commonly used software for drug designing and development.

**Keywords:** Drug, Discovery, Docking

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**P82**

**Pkc Inhibitors: An Effective Therapeutic Approach in Cancer Management**

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Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. According to WHO, cancer is the uncontrolled growth and spread of cells. It can affect almost any part of the body. The role of protein kinase C (PKC) activators as a causative agent in cancer progression is well documented. PKC cause a number of alternations in the oncogenes as well as tumor suppressor genes. The activated form of PKC α and PKC β isoenzymes are associated with malignant phenotype, in contrast PKC δ mediate anti-cancer effects. PKCs plays mandate role in disease progression through different pathways and is involved in signal transduction through gene level viz. cell cycle progression, tumorigenesis and metastatic dissemination. Apart this, PKCs also interact with oncogenes and tumor suppressors genes that ultimately leads to tumorigenic and metastatic phenotype. PKC plays an important role in the transformation and invasion by cancer at the cellular level. PKC inhibitors offer an attractive approach in the management of malignancy, however the lack of effective molecules targeting the PKC receptor is always a matter of mandate for the research fraternity. Thus, the targeting of PKC by its inhibitors has always remains an attractive approach for the treatment of many modalities.

**Keywords:** Protein kinase C, Malignancy, Tumorigenesis, Metastasis, Cancer
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Evaluation of Antimicrobial Activity of *Pyrus communis*

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**Background:** *Pyrus communis* Linn (Rosaceae), commonly known as Indian Pear, has been traditionally used for several medicinal purposes. *P. communis* is rich in source of vitamin C, phenolic compound, arbutin, isoquercitrin, quercetin and chlorogenic acid. In the present study the fruit of *P. communis* was investigated for its antimicrobial potential.

**Objective and Methods:** Ethyl acetate, hydro alcoholic and aqueous extracts were prepared from peel and pulp of *P. communis* and investigated for antimicrobial potential. Antimicrobial potential of above-mentioned extracts were analyzed by turbidimetric method and agar well diffusion method against *Staphylococcus aureus*, *Bacillus cereus*, *Staphylococcus subtilis* and *Escherichia coli*. **Results and Discussion:** Ethyl acetate, hydro alcoholic and aqueous extracts from peel and pulp of *P. communis* were investigated against *Staphylococcus aureus*, *Bacillus cereus*, *Staphylococcus subtilis*, *Escherichia coli*. **Conclusion:** It can be concluded that *P. communis*, hydro alcoholic peel extract showed the highest antimicrobial activity *P. communis* have antimicrobial activity against different Gram-positive and Gram-negative bacteria and can be used for prevention of various diseases caused by these organisms.

**Keywords:** *Pyrus communis*, Turbidimetric method, Agar well diffusion method, *Staphylococcus subtilis*, *Escherichia coli*.

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Perspectives on Effect of Ketogenic Diet on Type 3 Diabetes Induced Alzheimer’s Disease

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Type 3 diabetes is a term used when Alzheimer’s disease is generated by insulin resistance in the brain. This disorder is most often used to define people who have type 2 diabetes and are also detected with Alzheimer’s or dementia. This term is proposed by researchers because of the common molecular and cellular aspects among Type-1-Diabetes, Type-2-Diabetes and insulin defiance linked with memory loss and cognitive failure in old people. These investigations are supported by numerous vital biological studies that translate the impact of insulin in the pathology of AD through convinced mechanisms. The aim of this review article is to confer the cellular and molecular influences between diabetes and AD for labelling Type-3-Diabetes and also this review sheds light on the benefits of natural remedies such as lifestyle changes including ketogenic and low carb diets for treating type 3 diabetes and Alzheimer’s disease.

**Keywords:** Alzheimer’s, Diabetes, Ketogenic diet
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Cancer: Incidence, Etiology and Treatment

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“Cancer” term refers to the abnormal cell growth which have the ability to proliferate into other parts of the body. It has become the second leading disease that is putting the world into distress. WHO and International Agency for Research on Cancer (IARC) have disclosed around 18.1 million new cases and 9.6 million death cases owing to cancer. On considering the cancer mortality of the last five years, it has been found that men are more prone to cancer than women and African men are at high risk whereas Asian women are at lowest. The most common type of cancer are breast cancer, lung cancer and prostate cancer. There are numerous genetic and environmental factors that are responsible for the onset of cancer. For the treatment of cancer, various natural agents of plant origin have been used. Along with this, phytochemicals have also provided the lead for the development of drugs with chemo protective and anti-proliferative action.

Keywords: Cancer, Incidence, Phytochemicals

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Assessment of Ketogenic Diet in Parkinson’s Disease

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Background: A Ketogenic diet, for e.g; unprocessed meat, fish, low carbohydrate vegetables like cauliflower, etc, is a high-fat, low-carbohydrate & low-protein diet which brings down a person’s caloric intake. It was introduced as an anticonvulsant therapy for seizures and epileptogenesis, but it’s now indicated predominantly in GLUT-1 and Pyruvate dehydrogenase deficiencies. Objective: To assess the ketogenic diet in Parkinsonism. Method: Various published literature and articles were assessed from the past 12yrs i.e., 2006-2018 to assess the ketone bodies i.e.,β-hydroxybutyrate that protects the dopaminergic neurons of the substantia nigra which contributes an important role in Parkinsonism disease and acts as an alternative source of energy in glucose deprivation. Conclusion: Recent studies suggest that the ketogenic diet is helpful in reducing non-motor symptoms in Parkinsonism and other neurodegenerative disorder. Ketone bodies decrease oxidative stress which is seen in most neurodegenerative disorders. However, this diet may raise concerns in elderly people since it appears to promote protein catabolism. Patients with neurodegenerative disorders are at high risk of malnutrition and this diet may aggravate their condition.

Keywords: Ketogenic diet, Parkinsonism, β-hydroxybutyrate
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Hematopoietic Stem Cell Transplantation in Treatment of Multiple Sclerosis

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Multiple sclerosis is an autoimmune disorder in which immune eats away the protective covering of nerves that is irreversible. Generally the treatment of multiple sclerosis has modest effect at completely controlling or suppressing disease activity at the early dominating inflammation but overtime it may lead to progressive disability. There were more newer and effective agents because of the inability of these drugs to fully curb the inflammatory component of the disease. A more radical approach to suppress all the inflammation in multiple sclerosis including into CNS could be achieved by high dose of immunosuppression cytotoxic medications and resetting the immune system by hematopoietic stem cell transplantation (HSCT). HSCT is associated with qualitative immunological changes in blood beyond its immunosuppressive potential. The clinical studies have provided a strong proof of concept for HSCT in multiple sclerosis and have significantly contributed in understanding of the advantages and disadvantages of this approach and HSCT protocols.

Keywords: Multiple Sclerosis, Advance treatment, Hematopoietic stem cell transplantation

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Herbal Pharmacovigilance: From Myth to Application

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The safety monitoring of herbal medicines is compared and contrasted with that of other medicines currently undertaken in the context of the WHO International Drug Monitoring Programme. However, their regulations are different but they are equally important from perception of pharmacovigilance. Herbal products are also sought to have adverse effects because of attribution to problems of quality. Objectives of these guidelines are-to strengthen national pharmacovigilance capacity, provide standard definitions in terms of pharmacovigilance and safety monitoring of herbal medicines and the inclusion of herbal medicines in existing national drug safety monitoring systems. As that of another medicines, likewise, these are medicines should be covered with a framework to ensure that they conform to required standards of safety, quality and efficacy.

Keywords: International Drug Monitoring Programme, Adulterants, Herbal medicines, Reclassification, Safety
**P89**

**Side Effects and Risk Factors Associated with Oral Contraceptive Pills**

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**Background:** Oral contraceptive pills are the birth control pills which are currently of three types: combined estrogens-progesterone, progesterone only and the continuous or extended use pill. Most prescribed pill among this is the combined pill containing estrogens progesterone. 

**Objective:** To evaluate the risk factors and reduce side effects associated with the consumption of oral contraceptive pills.  

**Method:** Various published articles and literatures were assessed and reviewed from the past 5 years, i.e. 2014-2018.  

**Conclusion:** It was concluded that the synthetic estrogens and progesterone hormones has an influence on the hypothalamus-pituitary-gonadal axis of the female reproductive system and long-term usage of these can disturb the balance between the levels of the hormones in the body. Hence the patient consuming these drugs needs to be enlightened about their side effects and strategies to reduce them. 

**Keywords:** Oral contraceptive pills, Risk factors, Side effects

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**P90**

**Title: Inhibitory Effect of Formulated Garlic Oil Shampoo on Malassezia Furfur: A Yeast Associated with Dandruff**

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**Background:** Garlic oil (Allium sativum) has been used in cooking and in many traditional medicines; the essential oil contains diallyl disulfide as major constituent.  

**Aim:** This study evaluated the antifungal activity of garlic oil against Malassezia furfur, an opportunistic yeast associated with dandruff, by using a cup-plate method and broth dilution method.  

**Methods and Materials:** The composition of the essential oil (EO) of Allium sativum (Liliaceae), isolated by hydrodistillation from the plant’s aerial parts, was analysed by GC and GC-MS. From the minimum Inhibitory concentration (MIC) obtained, the oil was then incorporated at different percentages (0.05% and 0.1%) into shampoo formulations. The formulated shampoo was then evaluated by physico-chemical parameters like pH, viscosity, dirt dispersion, foam formulation and retention. A BBD was used in the study for optimization of formulation by using process variable.  

**Result:** The results clearly indicate garlic essential oil is effective in fungicidal activities and has the potential to be antidandruff agent.  

**Keywords:** Garlic oil, Traditional medicine, antifungal activity, Optimized, Box Behnken design
Recent Advances in Non-Small Cell Lung Cancer Biology and Clinical Management

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Despite advances in surgery, chemotherapy and radiotherapy over the last decades, the death rate from lung cancer has remained largely unchanged, which is mainly due to metastatic disease. Because of the overall poor prognosis, new treatment strategies for lung cancer patients are urgently needed. In this review, we summarise recent advances in non-small cell lung cancer (NSCLC) screening and diagnostic workup. Because of the growing evidence that the micro environment will become alternative therapeutic targets in the near future.

Keywords: Non-small cell lung cancer (NSCLC)

Ayurveda on the Grounds of Sports

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Sport medicine is a branch of medicine that deals with physical fitness with treatment and the prevention of the injuries related sport and exercise. It always seems hard to define the branch of the medicine because it involves a spectrum of many branches. The medicine however also vary according to the type of event and the physical exertion it involves. Ayurveda also acts on preventive and curative both the sides, therefore, plays a major role in sport medicine. Ayurveda medicines therefore have the potent actions against acute and chronic injuries with relatively negligible side effects in comparison to the allopathic agents. It is found to create miracles, from tennis elbow to Achilles tendinitis with a short duration of time as compared to the modern medicine. Performance enhancement and attaining physical and mental fitness all this can achieve with Ayurveda in sport medicine.

Keywords: Sport medicine, Dincharya, Achar rasayana, Dashvidha-pariksha, Panchkarma, Achilles, Tendinitis
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Indigenous Medicinal Plants – A Review

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The term “Medicinal plant” includes various types of plants used in herbalism. Plants have been used for medicinal purposes long before the prehistoric period. Medicinal plants have been used in virtually all cultures as a source of medicine. Medicinal plants have been playing an essential role in the development of human culture. As a source of medicine, Medicinal plants have always been at forefront virtually all cultures of civilizations.

Keywords: Medicinal Plants, Anti Inflammatory, Anticancerous

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Yoga Therapy as a Medicine

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Yoga is a group of physical, mental, spiritual practices or disciplines which originated in ancient India. Yoga is more than physical exercise, it has a meditative and spiritual core. Yoga being a natural rehabilitation technique is used widely in the whole world so people can continue living their whole life. Yoga is more about preventing diseases than treating them. Scientific studies have found yoga as a useful adjunct to the care of such conditions as asthma, arthritis, and heart diseases. Workshops are offered on hatha yoga for people with such conditions as HIV/AIDS, scoliosis, depression and pregnancy and cancer. Standardized protocols have been developed to meet the needs of scientific study and yoga therapy. What is typically measured in scientific studies of yoga doesn’t reflect what usually happens in the real world.

Keywords: Meditative, Spiritual, Natural rehabilitation, Mindful breathing, Savvy, Hatha yoga
Ophthalmic Drug Delivery Opening a New Avenue for Super and Supra Molecules

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Oculars are the specialized dosage form designed to instill onto the external surface of eyes (topically), administered inside or close to the eye or used in conjunction with an ophthalmic device. The ocuserts are used in the ocular drug deliveries that are the sterile preparations that prolong residence time of drug with a controlled release manner and negligible or less affected by nasolacrimal damage. Soluble ocular drug delivery is a very challenging attempt due to the unique anatomical and physiological barriers of eye. The emerging methods include polymeric-controlled release injections and implants, nanoparticulates, microencapsulated cells, iontophoresis, and gene medicines. Nanocrystal technology can also be used to produce soluble ocular drug inserts having improved bioavailability and solubility and thus provide sustained release of drug.

Keywords: Bioavailability, Intravitreal, Iontophoresis, Implants

Role of Antioxidants in Skin Protection

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Background: Human skin is constantly directly exposed to the air, solar radiation, environmental pollutants, or other mechanical and chemical insults, which are capable of inducing the generation of free radicals as well as reactive oxygen species (ROS) during metabolism. Experimental methods: An exhaustive literature survey was carried out through various search engines like Pub Med, Scopus. Various research and review papers were studied and conclusion is drawn. Objective: As the use of exogenous antioxidants orally or by topical application and interventions play role in preventing oxidative stress and in enhanced DNA repair. Treatment with some antioxidants such as ascorbic acid, tocopherols, and polyphenols are effective to enhance resistance to oxidative stress and prevent/improve skin aging.

Conclusion: This study reveals that cellular antioxidant defence mechanisms possess crucial for the prevention or removal of the damage caused by the oxidizing component of UVR. A wide variety of antioxidants or other phytochemicals have been reported to possess substantial skin photo-protective effects, such as lycopene, coenzyme Q, glutathione, carnosine, selenium, zinc, bio-flavonoids, green tea polyphenols, grape seed proanthocyanidins, resveratrol, silymarin, genistein, and others on UV-induced skin inflammation, oxidative stress, and DNA damage.

Keywords: Skin aging, Antioxidants, Free radicals, Reactive oxygen species, Vitamin C
P97
Potential Role of Phytochemicals of Fruits and Vegetables in Diet
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Background: Diet high in fruits and vegetables plays an important role for human health. They also have diverse role in the prevention of many disease such as cancer, diabetes, hypertension, neurological disorders and eye related disorders etc. Phytochemicals show strong antioxidant activity either alone or in combination form. Vitamin C have an excellent antioxidant potential which plays a very important role in bone formation, wound healing, and protect immune system. Objective: The objective of this review is to emphasis on sources and pharmacological uses of β carotene, lycopene and ascorbic acid. Methods: Data on “Potential role of phytochemicals of fruits and vegetables in diet” is collected from Pub Med, Research Gate, and Science Direct, chemical abstract, Google scholar. Conclusion: β-carotene, lycopene and vitamin C and other phytochemicals present in fruits and vegetables offers beneficial roles in prevention of various diseases.

Keywords: Antioxidants, Anticancer, Ascorbic acid, β carotene, Fruits, Lycopene, Vegetables, Human health benefits, Phytochemicals

P98
Prevalence and Use of Fitness Tracking Devices by College Going Students
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A fitness tracker is a device or application for monitoring and tracking fitness-related metrics such as distance walked or run, calorie consumption, and in some cases heartbeat and quality of sleep. It is a type of wearable computer. The term is now primarily used for smart watches that are synced, in many cases wirelessly, to a computer or smart phone for long-term data tracking. Students of GD Goenka University were asked to complete a survey that examined the types of fitness tracking devices owned, frequency of use and application of the device. Of 100 participants surveyed (53 females, 47 males), 74% are aware of fitness bands, 40% use fitness tracker, 26.8% wear fitness band daily, 33.33% use fitness tracker in order to be active,27.59% use it for weight loss. Only 37% participants think that fitness tracker is very useful and should be owned by everyone. It is observed that only a small percent of students own these fitness trackers despite the fact that they believe that fitness trackers are good to keep a person motivated. The main reason observed for the less use of fitness trackers among college students is lack of interest.

Keywords: Health, Fitness trackers, Students
P99
Curry Leaves and Diabetes
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Murraya koenigii (L) /Kadi-Patta /Mittho Limbdo/curry leaf plant is well known by many
names worldwide. Its leaves are also used as herb in Ayurveda and Siddha medicine in which
they are believed to possess antidiabetic properties, but there is no high quality of scientific
evidences for such effects. We can consume raw leaves as they are very beneficial to mankind
with no harmful side effects. Curry leaves, popularly known as kadi Patta, have long been used
to add a distinct flavour to curries and rice-dishes. The wonderfully fragrant, tangerine-like
flavour of the curry leaf is commonly used in south Indian delicacies. Curry leaf is also a
standard remedy in Ayurveda, the traditional medicine of India. While it is known to manage
health conditions like heart diseases, infections and inflammation, it is said to manage diabetes
too. Loaded with antioxidants like beta-carotene and vitamin C, curry leaves have the ability
to keep most diseases at bay, especially type-2 diabetes and heart diseases.
**Keywords:** Curry Leaves, Diabetes, *Murraya koenigii*

P100
Study about the Patterns of Self-Medication at Workplace
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Self-medication is a human behaviour in which an individual uses a substance or any
exogenous influence to self-administer the physical or psychological ailments. Selfmedication
also defines the use of drugs to treat self-diagnosed disorders or symptoms, or continuous usage
of prescribed drugs for chronic or recurrent disease or symptoms. The most widely self
medicated substance are over the counter drugs which are used to treat common health issues
at home, as well as dietary supplements. In our survey we found cough and cold medicines
have been rigorously used in selfmedication by the faculty. On second level after cough and
cold medicines pain killers or NSAIDs have been used very frequently in the process of self-
medication and selfmedication with these types of drugs on frequent basis can lead to fatal
consequences.
**Keywords:** Self-medication, Patterns, Consequences
P101

Determinants of Food Behavior- A Review
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Food behavior is a certain pattern of food eaten in different areas or region or a locality. It can differ from place to place. The study of food behavior has become increasingly important due to the rise in body weight dysregulation through eating disorders. In this review, various determinants of food behavior are discussed. Sensory factors are important determinants of appetite and food choices from birth to old age. The progressive change of sensory functions associated with aging affects eating behavior. Portion size is one potent environmental determinant of how much a person eats, regardless of hunger. Socio-economic factors also affect food selection and food intake in human societies. Due to apparent lack of time, the people are more inclined towards readily available junk foods. Factors such as education level and income determine food choices and behaviors in a way that does affect the risk of obesity. Behavioral science has provided many insights about crucial cause-and-effect relationships that affect nutrition and health. Therefore, for clinicians and nutritionists, it is of utmost importance to understand food behavior in order to effectively modify the habitual diet of individual patients or the general population.

Keywords: Food behavior, Eating behaviour, Physiological factors, Environmental factors

P127

Nutraceuticals
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The marketplace for nutritional supplements are increasing significantly. It has also been observed that the scientific and regulatory guidelines involving safety, efficacy and quality of nutritional supplements are common to most of the countries worldwide. Research at the office of dietary supplements at the National Institute of Health, USA mostly includes studies of vitamin D, iron, iodine, botanicals, enzymes and amino acids. One of the common nutritional supplements that are prescribed by doctors include Omega 3, as it plays a significant role in reducing fasting serum triglyceride levels and cardiovascular disease risk in individuals without HIV infection. It also can reduce hypertriglyceridemia associated with antiretroviral therapy. Supplements like Alpha lipoic acid ALA has reducing action on systolic blood pressure and diastolic blood pressure. Nutritional interventions in cancer patients improves the inflammatory responses and immune function.

Keywords: Nutritional supplements, Botanicals, Omega 3, Serum triglyceride, Hypertriglyceridemia, Systole, Antiretroviral therapy, Alpha lipoic acid, Diastole
P103
To Determine the Prevalence of Ayurvedic Treatment among the Students of G D Goenka
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Objective: The objective of this research is to check the prevalence of Ayurvedic treatment among students of GD Goenka University. The study points towards important aspects of student’s experienced Ayurvedic treatment. **Background:** Modern Ayurveda is a complex phenomenon that is both practiced as a whole system of medicine, and as various forms of self-care, including Ayurvedic massage, diet, yoga, etc. Ayurvedic medicines aims to look at the root of disease and how it’s related to a person’s thoughts, beliefs and lifestyle-in other words, a person’s “vital energy.” **Methods:** In this cross-sectional study, data collection will be done on a primarily basis with the help of questionnaire involving questions related to knowledge of students on Ayurveda and their practices on taking Ayurvedic treatment as a system of choice. The processing of data will be done by using Microsoft Excel including various graphs and tables. **Results:** This study emphasizes the importance of Ayurvedic treatment to the local context and maximizing opportunities for adults to become aware about this system. This research study will illustrate the knowledge of importance of Ayurveda among adults and spread awareness about the same. **Conclusion:** This study will enumerate the prevalence of Ayurvedic system of medicine and at the same time duration spread awareness among students.

Keywords: Ayurveda, Alternative medicine, Cross-sectional study, Students

P104
Foodborne Illness: Prevalence, Diagnosis and Management
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The ingestion of contaminated food results in a common disease with uncommon danger and owing to its origin from food, it is called as foodborne illness or food poisoning. Generally, microorganisms (bacteria, parasite or virus) are the culprit for the contamination of food. The recent estimate of the global burden of food poisoning highlights the significance of food safety. According to the report by World Health Organization (WHO), around 600 million people get affected and 4,20,000 die every year. This disease can prevail at any age but the children under the age of 5 years are at more risk. The type of food borne illness is diagnosed on the basis of the symptoms and the history of the eaten food. In the extreme cases, tests related to blood, urine and stool are performed to identify the responsible microorganisms. Primarily it can be managed with diet, proper rest and hydration. In case of worst condition, IV rehydration fluid is given to replace the fluid losses and prevent dehydration.

Keywords: Foodborne illness, Prevalence, Management
P105

Oral Disintegrating Films as an Emerging Platform of Drug Delivery

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The current era of pharmaceutical research is mainly focused on the innovative drug delivery system to enhance efficacy, safety, and patient acceptability. To develop, a new chemical entity for the developer is a very composite, expensive and time-consuming process, so recent craze is drift towards to improve and develops existing drugs designing by novel drug delivery system. In this context, the oral disintegrating films (ODFs) is gaining much more attention in all the plethora of avenues explored for rapid drug releasing formulations along with it has been very eminent among pediatrics and geriatrics patient. Moreover, these films have various pros over traditional fast disintegrating tablets as they can be used for schizophrenic and dysphagia patients. Orally disintegrating films have potential for business and market exploitation because of their sundry of benefits over orally disintegrating tablets.

Keywords: Oral disintegrating films, Polymer, Innovative drug delivery system

P106

Nutraceuticals: Remedies for New Generation

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Background: It is Hippocrates who quoted 2,500 years ago, “let food be thy medicine and medicine be thy food”. Objectives: Nutraceuticals have played a vital role in pharmaceutical industry since ages. It has many health benefits in the prevention and treatment of different diseases such as cancer, diabetes, obesity, hypertension, strokes, osteoarthritis, osteoporosis, depression and anemia. This review highlights different types of nutraceuticals, their role in various diseases, different marketed products and their status in current scenario. Methods: Data on selected topic have been compiled from Pub Med, Research Gate, Science Direct and Google Scholar. Conclusion: In this study, we have concluded that different nutraceuticals have been frequently used in prevention of different diseases such as beetroot juice, black tea and aged garlic extract in hypertension; walnut, chia and flax seeds in stroke.

Keywords: Nutraceuticals, Herbal products, Cancer, Dietary fibers, Vitamins
P107

Nanoemulsion as Immunoadjuvants: Formulation, Characterization and Efficacy Analysis

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Background: Nanoemulsion is a novel drug delivery system. Antibiotics given right after immunization diminish the efficacy of the vaccine to some extent. The extent of modulation of immunity by specific antibiotics depends on the plasma concentration, chemical structure and the antigen/adjuvant involved. Objective: To study, formulate and evaluate various types of immunoadjuvants. Methods: Nanoemulsion are fine oil/water or water/oil dispersion stabilized by an interfacial film of surfactant molecule having droplet size range 20–600 nm. Because of small size, Nanoemulsion are transparent. Nanoemulsion can be formulated using various methods like phase inversion method. Results: Loading of vaccine in immunoadjuvants like Nanoemulsion substantially increase immuno-efficiency of desired vaccine candidate. Conclusions: The study will help in designing new drug regimen and management of patient after immunization. The study will also help in studying vaccine-drug interaction.

Keywords: Nanoemulsion, Immunoadjuvants, Vaccines

P108

Pharmacovigilance Programme of India

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Pharmacovigilance is a crucial part of drug development process which helps in assessing any drug’s adverse event profile. The aim of Pharmacovigilance is to ensure patient safety and to know all the ADRs related to that drug which is used towards the treatment or diagnosing the patient’s problem with the respect with the amount of drug used for it. The Pharmacovigilance research is growing day by day across the world, as the Pharmacovigilance provides the best reporting of the different drugs, the regulatory authorities like USFDA and EMEA provides the great boom for the Pharmacovigilance market. As we talk about India government of India launched the Pharmacovigilance Programme of India (PvPI) in 2010. The main function of PvPI is monitoring the Adverse Drug Reactions (ADR) efficiently by setting up various adverse drug reaction monitoring centers across India and training personnel who can perform this function. PvPI has played an important role in generating awareness amongst healthcare professional (HCPs) about the importance and the process of reporting ADRs which has led to a multifold increase in ADR reporting.

Keywords: PvPI- Pharmacovigilance Programme of India, ADR- adverse drug reaction, HCPs - healthcare professionals
**P109**

**Quality by Design**

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**Introduction:** Quality by design is a systemic approach for maintaining the prescribed product quality.  

**Objective:** This paper gives idea about quality by design which ensures the design of a quality product. Quality by design can be applied to the development and evaluation of analytical methods. Product quality attribute can be predicted over the design space. Quality by design identifies the risk and best approaches to manage. Quality by design also optimizes the therapeutic outcome for patient benefit. Process is designed to consistently meet product quality attributes. Process is continually monitored and updated. Quality cannot be tested into products but it should be built in by design.  

**Methods:** CQA (critical quality attribute) & CPP (critical process parameter).  

**Result:** The product obtained by the use of quality by design was found to be of higher quality compared to conventional products.  

**Conclusion:** It shows comparison between product qualities by end product testing and quality by design. It gives application of quality by design in pharmaceutical development and in life cycle management. It gives linkage between inputs and critical quality attributes. The foundation of quality by design is ICH guidelines (Q8, Q9, Q10). Q8 is for pharmaceutical development Q9 for quality risk management and Q10 for quality systems.  

**Keywords:** Quality by Design (QbD), Process Analytical Technology (PAT), Critical quality attributes.

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**P110**

**Cosmetics and Skin Health**

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**Background:** - Beauty is an ornament of every lady. Ladies use various cosmetic products to remain beautiful and look young, irrespective of know the chemical composition, side effects of a particular product.  

**Objective:** - The objective of the study was to find out the type of products, different brands, their use, customer satisfaction, a reason to use product and expenditure.  

**Methods:** The study was based on a survey of cosmetic products among ladies. The questionnaires were prepared and circulated to gather the data.  

**Results:** - The “mac” was found to be the most consumable cosmetic brand with maximum consumers (78%), the cream was found to be (19%), and a candidate used the maximum product recommended beauty expert (25%).  

**Conclusion:** - It was concluded from the study that “mac” occupied the maximum market.  

**Keywords:** - Skin, Health, Beauty
P111

Formulation Development and Evaluation of Selected Medicinal Plants Extracts having Anti-aging and Anti-wrinkle Potential
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Background: Skin aging is a complex biological process influenced by a combination of endogenous and exogenous factors. Various medicinal plants have been investigated for their anti-aging properties. Objective: To formulate and evaluate an anti-aging and anti-wrinkle formulation containing extracts of selected two Indian medicinal plants v.i.z. Glycyrrhiza glabra Linn. and Emblica officinalis Gaerth. Methods: The methanolic extracts of selected plants were prepared by cold maceration technique. Formulation was optimized using central composite design followed by response surface methodology. Results: The extractive values of Glycyrrhiza glabra Linn. rhizomes and Emblica officinalis Gaerth. fruits were 6.44 %w/w and 15.82 %w/w respectively. The optimized formulation was light brown in colour, homogenous, consistent, with neutral pH, no irritancy, good spreadability with SPF value of 13.44. Conclusions: A better, safe and skin protective formulation containing herbal extracts is formulated with better sun protection, anti-wrinkle and anti-aging properties which may lead to the development of a potential commercial product.

Keywords: Antiaging, Emblica officinalis, Formulation, Glycyrrhiza glabra, SPF

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Iontophoresis & Knee Osteoarthritis: A Systematic Review
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Introduction: Osteoarthritis is the most common joint disease; in the near future, it is projected to rank second for women and fourth for men in the developed countries in terms of years lived with disability. Methodology: A literature search in the databases, MEDLINE (PubMed), Pedro, and the Cochrane Database of Systematic Re-views were included. Result & Discussion: There is significant improvement of iontophoretic technique in knee osteoarthritis patients. Conclusion: Innovative and cost-effective approaches that can prevent the development and progression of OA are urgently needed. We need to improve the treatment strategies for osteoarthritis in order to decrease costs, enhance osseo-integration and minimize wear, osteolysis and loosening and side effects of oral NSAIDs.

Keywords: Osteoarthritis, Iontophoresis, Cost Effective Approach, Oral NSAIDs
Design, Synthesis and Antibacterial Evaluation of Novel Ciprofloxacin Derivatives Bearing N-Thiomide Linkage with 6-Substituted -2-amino-1,3,4-thiadiazole
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In the present investigation, a novel series of ciprofloxacin were synthesized by the cyclization of various 6-substituted-2-amino-1,3,4thiadiazol with N-thiomide linkage carbon disulphide in the presence of N,N-dimethylformamide which lead to the formation of new ciprofloxacin derivatives. The structures of these compounds were elucidated by IR, 1H-NMR, ESI-MS spectral data and their purities were confirmed by elemental analysis. The invitro antibacterial activity of these compounds was evaluated against Gram-positive bacteria and Gram negative bacteria by microdilution method and then the MIC of these compounds were determined. The result showed that compounds showed promising antibacterial activity as compared to antibiotics ciprofloxacin and norfloxacin.

Keywords: Ciprofloxacin, antibacterial, thiadiazol

Development of Fermented Formulation (Arishta) of Silybum marianum seeds and Evaluation for Physicochemical Parameters
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Background: Arishta is the fermented formulation and is considered as the best formulation of ayurveda as it extract out the maximum active constituents. Objective: To develop fermented formulation of Silybum marianum seeds and evaluation for physicochemical parameters. Method: The arishta was prepared using the decoction of the seeds, Woodfordia fruticosa as sandhan dravya, cane juice and jaggery as sugar source and finally placed in incubator at a temperature of 32 °C for 10 days. Result: The alcohol content of the developed arishta was found to be 7.62% and pH was 4.20 and other physicochemical parameters were within the acceptable limits. Conclusion: The fermented formulation (arishta) of Silybum marianum seeds was developed. The alcohol content and other physicochemical viz. pH, color, odor and taste were found within limits. It can be concluded that the developed arishta can be further developed at commercial scale after evaluation for hepatoprotective potential.

Keywords: Arishta, Alcohol content, Specific gravity, Silybum marianum, Physicochemical parameters
P115
Role of Pranayam in Rehabilitation of COPD Patients
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Background: A study on COPD patients, for inspecting effects of yoga. Two groups were included, Group 1. Pranayama, medication; Group 2. Medication only. Objective: To identify the rehabilitation method of COPD through yoga.

Methods: Spirometer evidence, MWT, ABG, SGRQ, PFT. Results: Training-induced changes were greater in group 1 than 2 for following variables: FVC (% predicted) from 68 ± 4.2 to 72 ± 3.9 (p=0.11), FEV1 (% predicted) from 48 ± 2.4 to 52 ±2.1, (p=0.15), PEF (%predicted) from 24.2 ± 0.9 to 30.1± 0.8 (p<0.05), 6MWT from 262 ± 38 to 312 ± 47 m (p<0.05). There was decrease in (72 ± 2.5 to 66 ± 2.9, p<0.03), activity (66± 2.1 to 50 ± 1.7, p<0.005), impact (53± 2.9 to 39 ± 1.8, p<0.008) and total score (55± 2.9 to 48 ±2.3 p<0.02). Conclusion: Yoga increases the rate of diffusion in lungs and improves respiratory rate of COPD patients, increases SA for gas exchange.

Keywords: Pranayama, COPD - Chronic obstructive pulmonary disease. SGRQ - St. George's Respiratory Questionnaire. 6- MWT- Six minute walk test

P116
Effect of Meditation and Antidepressant or Anti-anxiety Drug on Psychosomatic Disorder
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Psychosomatic disorders are considered as the outcome of negative thought pattern and are manifested in form of physical illness. In other words, psychosomatic disorders are the bodily ailment due to mental or enthusiastic unsettling influence, in which psychological stress have antagonistic effect on physiological (somatic) working ultimately leading to distress. The scope of the practice of Saheja Yoga therapy and similar other ancient positive health measures in the prevention and treatment of stress and psychosomatic disorders may be fruitfully explored.

Keywords: Psychosomatic disorders, Meditation, Yoga therapy, Sympathetic nervous system
P117
Green Synthesis of Silver Nanoparticles and Their Characterization using Plant Extract
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Green synthesis of silver nanoparticles was achieved by using flower of Butea Frondosa plant extract. Butea Frondosa is an increasing demand for the synthesis of nanoparticles due to their wide medical applications. As a reducing agent 1mm silver nitrate was taken. The extract was heated and the change in colour shows the formation of silver nanoparticles. The characterisation was carried by using UV-visible spectrum and Dynamic light scattering (DLS). The results shows that the absorption peak was around 420nm in the UV-visible spectrum. This synthesis is fast, simple and without the use of any toxic chemicals.

Keywords: Silver nanoparticles, Butea Frondosa, DLS, Plant extract, Green synthesis, UV-Visible spectroscopy

P118
Role of Nutraceuticals in Recent Health Problems
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In 1983, Stephen Defelice found the Nutraceuticals, which is a term combined the “Nutrition” and “Pharmaceutical”. So, the oral dietary components occurring naturally in foods having health benefits and/or a medical activity. Nutraceuticals can also be from herbal products and processed foods such as soups, cereals and beverages which are neither nutritional products nor the medicines. Many countries define nutraceuticals in many ways but in common way it can be defined as any substance extracted from foods but sold as medicines having physiological benefits and providing protection from chronic diseases. Nutraceuticals can be used for several health benefit actions like prevention of chronic diseases, improving health, delay ageing process or to support the structure and functions of body. In recent time nutraceuticals gains a remarkable area of interest because of safety, multiple therapeutic efficacy and its potential nutritional activity. But as that of pure pharmaceuticals, nutraceuticals can not be patent in government section. In recent time, nutraceuticals also playing a very important role in cure and management of various pathological conditions like cancer, cardiovascular problems, neurological disorders, diabetes and atherosclerosis etc.

Keywords: Nutraceuticals its forms, role in recent pathological conditions
Addiction Habits: Consequences
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Background: Bad habits are hard to break due to addiction. Several incidences have been found where the body and mind become used to the nicotine and alcohol so that a person feels very deficient and become keen to have it just to feel normal. Objective: The purpose of the study was to study the number of population use/ addicted to nicotine and alcohol. Methodology: A survey was conducted and data was compiled using questionnaires. Result: It was concluded from the study that 32% population consumed cigarettes, 24% Tobacco, 24% hookah and 20% were alcoholic. The cigarette was most common due to easy availability and to most use among friend circle, easy availability at shops. It was found that persons have high work pressure were the most frequently used of cigarette. Conclusion: It was concluded that addiction habits result in degraded health physically and mentally. Keywords: Cigarettes, Smoking, Alcohol, Hookah

Patterns of Self-Medication among Para-Medical Science Students
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Self-medication is generally thought to be the treatment of common health problems with medicines especially designed and labelled for use without medical supervision and approved as safe and effective for such use. In this study we had studied the patterns of self-medication in para-medical students which helped us to understand that how negligence and lack of full information and awareness among the students can be fatal for the user, irrespective of their knowledge in the field. Keywords: Self-medication, Students, Fatal-effects
**P121**

**Effect of Milk from Different Animals on Human Health**

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**Background:** Today milk is an obligatory food product of healthy people. It is a very good source of minerals, proteins, fats, carbohydrates, and vitamin. It plays an important role in the development of bones. The composition of milk varies from animal to animal. Milk is obtained from cow, buffalo, goat, camel, sheep, deer and mares. The composition of milk is also influenced by the nature of fodder, the living environment of the animal. **Objective:** The objective of the study was to find out the effect of milk obtained from different sources on human health. **Methodology:** The survey-based study was performed. The questionnaires were prepared to gather data. **Result:** It was concluded from the study that the peoples who has intake milk regularly were active and maintained good health as compare to peoples not consuming milk or consuming milk products. Cow milk was found to be the best in terms of the health of people due to low fat. **Conclusion:** It was concluded from the study that cow milk is better than milk obtained from other animals.  
**Keywords:** Milk, Dairy, Polybag, Animal

**P122**

**Green Chemistry as a Tool for Synthesis of Drug Molecules**

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Green chemistry spreads pollution awareness through scientific discoveries under the area of research and development. A set of principles are utilized that reduce or estimate the generation of hazardous substances in the steps of particular synthesis or process. By following the principles of green chemistry, chemists and medical scientists can highly reduce the risk of human health and the environment. The utilization of eco-friendly, nonhazardous, reproducible, efficient solvents and catalysts are the most simple and direct ways for the application of Green chemistry in pharmaceuticals and in the synthesis of drug molecules, drug intermediates and research involving synthetic chemistry. Being an energy efficient process microwave synthesis is also an important tool of Green chemistry.  
**Keywords:** Green chemistry, green solvents, green catalyst, microwave synthesis
P123
Role of Nutraceuticals in Recent Health Problems
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In recent era, herbal drug dosage forms have achieved an impressive improvement across both
developing and developed countries. Herbal products for medicinal efficacy may be defined as
finished, labelled medicinal products that contains active ingredients from aerial or
underground parts of plant whether in the crude state or as plant preparation. Herbal dosage
forms are plant products which does not involve any chemical processing. Processing of herbal
plants can be employed and synthesize in different ways like tea, syrups, essential oils that
includes a ground or powdered form of herb. Herbal dosage form can be administered by a
variety of routes namely topical, oral, rectal, respiratory, ophthalmic and nasal. A large number
of novel herbal formulations are available like polymeric nanoparticles, Nano emulsion,
liposomes, phytosomes have been reported to be derived from plant materials. There is
abundance therapeutic potential in herbal dosage forms. Polar constituents like flavonoids,
terpenoids, tannins, xanthones administered through novel drug delivery show much better
absorption profile
Keywords: herbal formulations, novel dosage forms, therapeutic effect, medicinal effect

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Nanopharmacology: A Novel Approach to Address Complex Clinical
Manifestations
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Nanopharmacology can be defined as the applicability of nanotechnology to the development
and/or discovery of methods to deliver drugs. Nanotechnology has been used in drug delivery
to improve the therapeutic outcomes of complex diseases. Research has been focused on the
development of novel nanoparticles and optimization of properties of nanoparticles in relation
to their biological fate and functions. Regarding the application in diabetes management, a
nano-technology enabled closed-loop insulin delivery system was devised to provide dynamic
insulin release at a physiologically relevant time scale and glucose levels. These examples,
together with other research results, suggest that utilization of the interplay of pharmacology,
pathophysiology and nanotechnology is a novel and site specific approach to develop
innovative drug delivery systems and therapies with high efficiency and translational potential.
Keywords: Nanoparticles, Pharmacology, Nano materials
Mitigation of Adverse Effects of Drought on Production of Blackgram by Foliar Application of Potassium Nitrate

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Effects of foliar spray of KNO3 (200ppm) on number of pod per plant, seed weight under moisture stress were studied in Black gram. Plants were subjected to mild, moderate and severe water stress which was created by withholding irrigation. The result indicates that moisture stress adversely affected dry matter and yield. Detrimental effect of water stress on yield were less in plant grown at 200ppm KNO3. The yield increased 2-3 folds as compared to control in water deficit condition at 35DAS. The detrimental effects of water stress on Black gram were markedly less in K-fed plants. It is concluded that K-application helped plants in maintaining favourable internal tissue moisture and metabolic activities under water stress.

Keywords: Vigna mungo, KNO3, Water Stress
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