IJCSE International Journal of Computer Sciences and Engineering Open Access
Review Paper Vol.-7, Issue-2, Feb 2019 E-ISSN: 2347-2693

Strengthen and Respect Last Qualifying Examination Rather Than Introducing Entry/Exit Examinations

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DOI: https://doi.org/10.26438/ijcse/v7i2. 893895 | Available online at: www.ijcseonline.org

Accepted: 25/Feb/2019, Published: 28/Feb/2019

***Abstract*—** Entry/Exit Exam System, the government has to think about to increase the effort put forth to improve the quality of the education and strengthen the evaluation process. There is no need of these kinds of experiments to impose on students. There is only need to strengthen the Higher Education evaluation System so that the last qualifying examination marks could be considered as final outcomes of students learning.

***Keywords*—** Entry / Exit Exam, Policy on Education, Curriculum, Evaluation Policy, Experiments on students.

I. INTRODUCTION

Author of this paper ,which is the most relevant and virgin idea of mine , as during the decades of experiences on the different frame works and modules of academic set up and pattern, transitional journey of Indian academic system has compelled every stake holders to think over the actual scene. The Central/State Government gradually executing the new testing methods for students by introducing new Entrance/Exit Examinations and now this became the fashion trends in testing system to introduce Exit Examinations for almost every discipline which are forcefully imposing on students.

It is suppose to be happen that; the Government makes it mandatory for every graduate to appear for an 'Exit Exam' but Exit Exam renders Higher Education System redundant. Universities are authorized entity by the Government to develop curriculum, conduct examinations and award degrees and competent enough to execute all. Introducing new exam patterns over existing examination is not a right path to improve education and evaluation quality.

Rather than implementing the Entry/Exit Exam System, the government has to think about to increase the effort put forth to improve the quality of the education and strengthen the evaluation process. There is no need of these kinds of experiments to impose on students. There is only need to strengthen the Higher Education evaluation System so that the last qualifying examination marks could be considered as final outcomes of students learning skills.

In my Opinion, students should be accountable for what they have learned in entire duration of their program and across the Nation only single exam system should be implemented by the Central Government for Secondary (10th) and Senior Secondary Education(12th) level and the standardized 10^{th} & 12^{th} examinations should be conducted by Central Examination Agency like National Testing Agency (NTA) or Central Board of Secondary Education (CBSE) with the help of State Governments in two choice of languages i.e. English & State Language. The passing criteria should be same for both mode of languages and the Central Government decide the minimum Percentage for Merit of every discipline for Higher Education/Recruitment.

Syllabus of all undergraduate programs should be as per society and industry needs including studies of subjects like Human Ethics & values, Moral Education, Analytic & Aptitude based Knowledge, General Knowledge, Skill oriented knowledge of particular discipline etc. so that students will seriously concentrate on their studies and can enjoy their curriculum throughout their student life. There will be no more burden remains on students for taking extra coaching to qualify the other Entrance/Exit Exams and Students can focus on their studies with full concentration. However, the Exit Exam policies may have adverse effects on students during preparation of their final year examination. Most of students give weightage to only their competitive examinations & coachings that affects on their overall performance and they obtaining low grades/less marks in their School/University Examinations ultimately students are suffering a lot due to these complicated education policies resultant to increasing drop-out rates due to lack of concentration in their core studies, extra mental and psychological burden on students to qualify the entrance examinations, wastage of their time and money and increasing rate of unemployability and unfortunately thousands of students across the country also commit suicide

every year who face failure in examination, unemployment and depression due to high pressure of Entrance Exams.

If Government put efforts to strengthen the quality of education with required modifications in curriculum may be called as 'National Curriculum'; comprises 70 % core subjects, 20 % Skill Based and 10 % Value Added Courses and by giving weightage to student's last qualifying examination scores so that student's could be motivated to gain adequate knowledge of their curriculum and will obtain good score. They will not need to spend their money on special coaching and their valuable time & money will also save. Universities should be authorized for declaration of Merit for entry into next level for higher education or jobs as well as to be registered as a professional in their respective Registration Councils on the basis of students last qualifying examinations score without any Exit Exam. If Students not secure good marks should be given an opportunity to reappear in examination to improve their score card. In addition the Government should train group of teachers as a National Assessor for assessment of skill based courses and declare "National Skill Assessor Board". The Board provides facility to each & every University to assess their student's skills.

The Government should promote and give weightage to students last qualifying examination score by providing various scholarship and fellowships to those students who obtained higher marks in their last qualifying School/University examination. Jayoti Vidyapeeth Women's University, Jaipur adopted the same policies since its inception to provide subsidy to meritorious students who obtained good score in their last qualifying examinations at their entry level and fellowship provided to those students who did hard work throughout entire duration of their program to obtain highest marks.

Table 1

	Curriculum									
	Core subjects (70%)		Skill Based Subjects (20%)		Valued Added Subjects (10%)		Total (100%)		Entry level Of Employability (Consider For Government Jobs and Eligible for Registration in Professional Fields)	Entry level of Higher Education (Consider For Higher Education in Any University) All University declare their own Merit List
	Marks	percentage	Marks	Percentage	Marks	Percentage	Overall performance Marks	Percentage		
Max. Marks	70	100%	20	100%	10	100%	100	100%		
Minimum Eligibility Score/ Marks	60	86%	18	90%	8	80%	86	86%	Eligible for Administrative, Science & Research Services like IAS, IPS, Public Services etc.	Eligible for Medical & Engineering Disciplines
	55	78%	15	75%	5	50%	75	75%	Eligible for Medical & Technical & Teacher Education Services	Eligible for Management & Commerce and Teacher Education Disciplines
	45	64%	10	50%	3	30%	58	58%	Eligible For Arts & Other Ministerial	Eligible For Arts,

									Services	Humanities & Other Disciplines
• Students secured below 58 % marks are eligible to apply for defence Services/Jobs such as Police, Army etc.										

CONCLUSION

Author of this paper is also under the opinion that a global discussion must be started by sharing his opinion for the topic of National issue 'Entrance/Exit Exam' and more wider discussions forecasted to be needed from all stakeholders for right solution in context to Indian Academic system..

References: Below are some of the concerns highlights similar studies in the different parts and levels of Academicia of the Globe.

REFERENCES

[1]. American Federation of Teachers. (1995) Setting Strong Standards: AFT's criteria for judging the quality and usefulness of student achievement standards. Washington, D.C.: American Federation of Teachers, 1-12.

[2]. Bishop, John. (1993). "The Impact of Academic Competencies on Wages, Unemployment and Job Performance." Carnegie/Rochester Con- ference Series on Public Policy, edited by Burton Malkiel and Charles Plosser, Vol. 3.

[3]. Costrell, Robert. (1994). "A Simple Model of Educational Standards." The American Economic Review. Vol. 84, # 4, 956-971.

[4]. Jurges, H., Schneider, K., Senkbeil, M., Carstensen, C. H. (2012). Assessment drives learning: The effect of central exit exams on curricular knowledge and mathematical literacy. Economics of Education Review 31, 56- 65.

[5]. Pedulla, J., Abrams, L. M., Madaus, G., Russell, M., Ramos, M., & Miao, J. (2003). Perceived effects of state-mandated testing programs on teaching and learning: Findings from a national survey of teachers. Chestnut Hill, MA: Boston College.

[6]. Effinger, M. R., Polborn, M. K. (1999). A model of vertically differentiated education. Journal of Economics, 69, 53-69.

Mind Game: Mr. Google Connect ward to the Identified Community

Panckaj Garg

Abstract: ***More or less social networking sites are creating hindrance in the streamline path of young and minor learners. There is need of Google safe searching engine for students, better if screened on the basis their gender, where they can access freely but highly prevented from browsing of inappropriate contents, links & Websites so that they do not fall prey to various cyber crimes.. Mobile manufacturing Companies need to provide special OTP based mobile Gazettes for students enabled with calling features i.e., incoming and outgoing call facility on only registered numbers which are enlisted in students' contact list after OTP moreover better Validation through their parents mobile number only. Their call report should be viewed on parent's mobile number and mobile bill also should be merging with parent's mobile bill. In this Digital era, Face book has been a very important part of everyone's daily life to connect with the Global World. There is need to launch some exclusive features on face book for students where students can connect to only authorized persons for which friend request should approved by their parents through their account only including features to view all chat of their wards.***

Index Terms: Google, Cybercrime, Surveillance, Minors, Virtual Environment, Networking sites.

I. INTRODUCTION

Author of this paper is the Founder & Advisor of India's First State Private Women's University "Jayoti Vidyapeeth Women's University, Jaipur" in discharge of the daily working responsibility had been keen interested to study the potential inherited to a young and to a minor learner. Sometimes this potential spoils and diverted in the dimension of thinking. Scientifically it has been an evident fact that a motion may be streamline zigzag, turbulent as according to the potential of the body and forces applied to it. In the one dimension a single unit of Force can give maximum displacement but if the same magnitude of force be dived into two dimensional path the motion will be less disturbed where as in the case of three dimension motion bodies starts to rotate on a particular point and very less displacement in the position of the said body may be recognized. In the nutshell summary of the above fact is that during the learning periods path and dimension of the learners be one dimension which may leads them to the prospective career. Mode of learning shoud be a composition of traditional values and modern facts and intellectual societies should not mistake to forget the rich ancestral history of ASHRAM and GURUKUL where there was tra

ining of moral sprit with accountability bearing, responsibility reflecting education. Mind of a young or a minor learner is just like a plane paper then it is for the environment what it teaches more than any other mentors of such learners. Ediction is undoubtedly a type of disease and different developed countries are announcing various prizes for those who e can escape themselves from the mobile phone. Author is coming the points he get as the feed backs from the parents across the country and abroad. In between it seems relevant to say few words about the University where thoughts get generous mode - The Jayoti Vidyapeeth Women's University, Jaipur has been established and incorporated under the Act 17 of 2008 passed by Rajasthan State Legislature and notified by the Government of Rajasthan through its official Gazette Notification No. F.2 (23) Vidhi /2/2008 dated April 21, 2008.And one of the leading Women's University in India and committed to provide "Education for Community Development" leading to Women Empowerment.

II. FEEDBACK

1. Safe, Secure, Identified Virtual Environment for minors and students

In our Country, As per the rule by Government and also most people seem to accept children's (below 18 Years) exclusion from voting, they strongly agree on the perception that they do not have Right to Vote, because they are not enough mature to understand the difference between right & wrong and incapable of making reasoned and wise decisions. same as for students (upto graduate level), we noticed that parents wants to keep a watch on their children's each & every physical activity and need to monitor all of them.

2.Thought Process- If there is need to monitor physical activities of the students by their parents, then this is also necessary to identify their virtual resources , online links & contacts etc. by their parents.

3. Outcomes

1. Mobile manufacturing Companies need to provide special OTP based mobile Gazettes for students enabled with calling features i.e., incoming and outgoing call facility on only registered numbers which are enlisted in students' contact list after OTP Validation through their parents mobile number only.

Their call report should be viewed on parent's mobile number and mobile bill also should be merging with parent's mobile bill.

Revised Manuscript Received on March 25, 2019.

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2. In this Digital era, Facebook has been a very important part of everyone's daily life to connect with the Global World. There is need to launch some exclusive features on face book for students where students can connect to only authorized persons for which friend requests should approved by their parents through their account only including features to view all chat of their wards.
3. There is need of Google safe searching engine for students where they can access freely but highly prevented from browsing of inappropriate contents, links & Websites so that they do not fall prey to various cyber crimes. Face book & Google Accounts should be linked to their Aadhar Numbers for differentiation of Age of users of India and to avoid creation of fake & duplicates accounts

III. ANALYSIS AND ACCLAMATION

Author of this Research work is and has been under the impression that mentioned points taken into the account of study will be accepted by Govt. of India, Face book, Google & Mobile Manufacturing Companies so that Indian parents can feel more secure and able to monitor their ward's activities virtual contacts, links etc. and students could not misuse virtual tools and does not waste their valuable time.
Interestingly and notable fact for all the readers that Women's University (JVWU, Jaipur), provide secure monitoring & pre indentified environment for our students. It also provides communication facility to the students only on registered numbers which are verified by their parents because Mobile phones are prohibited in the Campus. We are providing all facilities through special software's and presently Face book and other social networking sites are banned for students due to security concerns..This is a case may be taken for the wide range of study and formulation for the future action of planning and activation by the different agencies and regulatory bodies either or wholly responsible for a bright India and a healthy minded India. Author of the paper understand that the use of mobile phones, Internet and social networking sites are must and we want our students to be updated with this technical advancements but this is only possible if Face book Google & other Social networking sites can provide separate link with such features for students to access these sites safely. If such kind of software and technologies are launched, it will be very helpful for both students and their Parents to pursue education without any obstacles and not fall prey to` the inappropriate content for the student to practice good habits for lifetime. Society should come forward for the safeguard of the future generation as no artificial intelligence is as intelligent as the mind of a young free from all the edictions and no simulation is as strong as the vigilance and early care of the parenting of the wards .The century of 21th for those who will learn the equilibrium of act and thought for the better tomorrow. Author expects kind support for the noble cause of community development.

REFERNCES

1. Abhimanyu Shankhdhar, JIMS / Social media and business
2. Mahmoudi Sidi Ahmed et al., "Detection of Abnormal Motions in Multimedia", Chania ICMI-MIAUCE'08 workshop, Crete, Greece, 2008.
3. S.Shabnoor,S.Tajinder,Social Media its Impact with Positive and Negative Aspects IJCATR, Volume 5– Issue 2, 71 - 75, 2016
4. Bin Zhao et al., "Online Detection of Unusual Events in Multimedia via Dynamic Sparse Coding", 2011.
5. Nagar, Himanshu, Chetna Dabas, and J. P. Gupta. "Navie Bayes and K-Means Hybrid Analysis for Extracting Extremist Tweets", ACM Conference, pp 27-32.
6. S. Willium, "Network Security and Communication", IEEE Transaction, Vol.31, Issue.4, pp.123-141, 2012.
7. W.Tariq, M.Mehboob, M.A.Khan, F.Ullah "The Impact of social Media and Social Networking on education and Students of Pakistan" international Journal of Computer sciences issues, Vol:9,No:3,July 2012

Pretext of UNNAT BHARAT ABHIYAN of HRD and VILLAGES DEVELOPMENT PLAN of University

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Received: January 09, 2019 Accepted: February 12, 2019

ABSTRACT: *The data emerged after the hectic primarily study of five villages of District Jaipur (Rural) by the students of the University under the Faculties as Homoeopathic Science , Faculty of Physiotherapy & Diagnostics (including Physiotherapy , Medical Lab technology, Radiation Technology, Optometry), Faculty of Pharmaceutical Science, Faculty of Agriculture & Veterinary Science and Faculty of Education & Methodology (Teaching Education BSc.BEd, BA.BEd BEd & MEd.) under way of village survey, Villages household survey and Village Identify survey "Mera Gaon Meri Pahchan".The data collected from these surveys, where the students identified the common problems of rural society, gap between knowledge and villagers, also the rural society needs after conducting brainstorming session between teachers and villagers involving old age people, youth, students and Women. Implementation level be taken into the account as the Government stand regarding handing over 30 hectares Barren Land in University surroundings to convert into lush green forest and for cultivation of fodder but the decision is still pending.*

Convergence of investigations and analysis intended basically on the focal issues prevailing in the adopted villages. Topics and dialectics considered remained Health and Hygiene, Agriculture and Rural Technology, also Education and Communications.

Key Words: UBA, Rural Technology, Adoption, Community Development, Women Empowerment Agriculture, Communications

Introduction

The Jayoti Vidyapeeth Women's University is selected by Ministry of Human Resource Development, (MHRD) Government of India as a participating Institute to work on Rural Community Development projects under **"Unnat Bharat Abhiyan"**

To excute this program of larger social and community importance ,University established University 'UBA Cell' under coordinationship of the Author of the paper . To come on the zest of the work readers and scholars should follow the below mention synchroynsations as

University UBA Cell- To fulfill and worldwide recognition of the University Mission **"Education for Community Development Leading to Women Empowerment"** and implementation of the objects of Unnat Bharat Abhiyan, the University adopted the five villages of University surroundings **namely Jharna, Keshrisinghpura, Kotjewar, Devla under Gram Panchayat- Jharna and Village- Kapadiyawas under Gram Panchayat- Gadota.** with the permission of District Collector, Jaipur.

The University UBA Cell started functioning on the following strategic village development plan as per guidelines of UBA. and to implement & execute the project all funds and Human power was to be provided by the sponsoring body, Jayoti Vidyapeeth Women's University, Jaipur. Though the University does not need any grant or financial aid from the Government remaind under the passion and zeal that need only support from the Government and Concerning Bodies to execute the defined activities for Rural Community Development under **"Unnat Bharat Abhiyan"** and to be recognized for work done by UBA for this purpose. In the due course of study and exercises ,the Girl's students of the University from Faculty of Ayurvedic Science (including Yoga & Naturopathy), Faculty of Homoeopathic Science , Faculty of Physiotherapy & Diagnostics (including Physiotherapy , Medical Lab technology, Radiation Technology, Optometry), Faculty of Pharmaceutical Science, Faculty of Agriculture & Veterinary Science and Faculty of Education & Methodology (Teaching Education BSc.BEd, BA.BEd BEd & MEd.) started village survey, Villages household survey and Village Identify survey **"Mera Gaon Meri Pahchan".** Meanwhile

The primary data collected from these surveys, the students identified the common problems of rural society, gap between knowledge and villagers, the rural society needs after conducting brainstorming session between teachers and villagers involving old age people, youth, students and Women under guidance of **University UBA Cell Coordinator and the**

All members AND STAKEHOLDERS agreed firstly on UBA Cell functioning in following working areas heads as in the first phase mentioned below:

A) Health & Hygiene
B) Agriculture & Rural Technology
C) Education & Communication

Analysis: The Recommendation finalized after brainstorming sessions as per relevant working areas heads which are as follows:

Working Area Head
A). Health & Hygiene

Scope of Work: Screening, Routine Health Check-Up, Health Awareness, Hygiene & Restoration of Health.

1. University Medical students started health checkup of villagers and issued Health Card to each Village House to Promote AYUSH medicine and University provided the Ayurveda & Homoeopathy Hospital facilities including Eye, Dental and Diagnosis Procedures.

2. Screening for Vaccination & Immunization at each & every house in the village and all Government & Private schools of the adopted villages.

3. Health awareness camp, Government health programs & policies, distribution of prophylactics, precautions of the seasonal diseases, awareness of health hygiene.

Recommendation: For the implementation of above medical programs, the University UBA Cell advised to the University Management to inculcate the following suggestions in the curriculum as a clinical exposure activity in the University Community Development Activities (CDA) in following manner.

- Group of 4-7 students deputed for Health & Hygiene Awareness programs for a whole year at each house of the village. Students of BAMS, BHMS, BNYS & BPT who are actively involved in the awareness programs.

-Group of 10 students are deputed for each school Health Check-up & Awareness programs as mentioned schedule

-Yoga & Naturopathy 3 students for each village for morning weekly Yoga classes and 2 students for each school of adopted villages for 4 hrs weekly Yoga Session.

Need Support From Government of Rajasthan/Government of India- Declare University Hospitals as a Referral Hospital of nearby Primary Health Clinics (PHCs) and Give directions to Asha Sahyogini (Primary Health Workers) to refer patients to the University Hospital and empanel University Hospitals for all National Health Mission (NHM) and AYUSH Health Mission programs.

Execution

1- University accepted the recommendation of University UBA Cell and declared all UBA activities Under **"Unnat Bharat Abhiyan "** as a activities of University compulsory programs, namely **"Community Development Activities" (CDA)** and Grade will be provided to the students against these activities which will be mentioned in their mark sheet.

2. Approval received from Government of Rajasthan for health check-up of Schools & Villages, and Government agreed to provide Vaccination & Immunization Trainings to AYUSH medical students of the University under National Health Mission (NHM).

3. The Yoga training camps also have been started by Yoga teachers & students from May 21, 2018 to June 21, 2018, at our two adopted villages namely, Jharna & Kapadiyawas and next camp will be organized from September 2018 to May 2019.

Feedback forms are also filled by students quarterly and the UBA Cell will be quarterly analyze the weakness of activities and further needs.

Working Area Head
B) Agriculture & Rural Technology

Scope of Work - Infertile Soil due to salty water and no other alternative of irrigation facilities, lack of awareness of organic farming and rural technology, lack of knowledge and awareness of livestock health etc.

1- Agriculture Students of University Agriculture discipline will contact each farmer of the villages and provide them **Soil Health Card & Crop Advise Card** after consultation with their teachers.

2. Adopt Land from farmers of University adopted villages for forest tree plantation, Fodder cultivation, including growing Hydroponic fodder, prepare water pit to collect ground water to grow algae, manure pits to use agriculture waste and cow dugs and to develop a sample organic farm house to the motivation of other farmers.

3. Veterinary care & awareness camps provided to improve Livestock Health of the villagers for agriculture & their economic growth.

4. Awareness of organic farming, medicinal plantation and develop e- agriculture marketing portal.
5. Develop Small agriculture food process industry at University Campus for local community Women and develop
e- market to sell their products.

Recommendation

For implementation of above agricultural & rural technology programs, the University UBA Cell advised to the University Management to inculcate the following suggestions in the curriculum as a practical exposure activities in University **"Community Development Activities (CDA)"** or as a practical activities which are compulsory part of the curriculum of final year Agriculture students under **The Rural Agricultural Work Experience (RAWE)** as are following:

-Two students of II year & III year from agriculture discipline will collect & check the soil with the help of teachers including testing of Water PH level and distribute the Soil Health Card and Crop Advise Card of each farmer of the villages.

- 5-10 students of the final year from agriculture discipline will start activities on University adopted land under **The Rural Agricultural Work Experience(RAWE)** (which is a compulsory curriculum for every agriculture student in their final year syllabus) and develop organic farming with border forest tree, cultivation of fodder & vegetables, small nursery, manure bank, rainwater pit & salty ground water pit for growing algae to change the PH level of the salty water for utilization for these plants and fodder production.
- Final year students also organize veterinary clinic under the consultation of veterinary Doctor to promote livestock health of the villagers and their effective use in agriculture and their economic growth.
- Develop online portal for the farmers of the adopted villages to bit their crops and agriculture food processing items
- Establish and marketing of small agricultural business unit especially for women of the villages and unemployed male for production of pickle, papad, chips, Murabba, packaging of agriculture items, organic manure etc. to give these Villages their own recognition.
- First-year students of the agriculture discipline will involve awareness programs to spread awareness of all Government policies among villagers.

Need Support From Government Of Rajasthan, University Grand Commission (UGC) and Indian Council of Agricultural Research (ICAR)-

UGC & ICAR may include the above mentioned activities in **The Rural Agricultural Work Experience (RAWE)** of the final year curriculum of agriculture program . We have already sent our proposal to the Government regarding handing us over 30 hectares Barren Land in University surroundings to convert into lush green forest and for cultivation of fodder but the decision is still pending.

If we will get the success then it should be compulsorily implemented to all Agriculture colleges/universities by the Government to convert at least minimum 20 Hectare infertile land into fertile land by which plantation on the such barren lands and huge amount of fodder could be grown for cattle and other abounded animals. the grants provided to the agricultural Universities/Colleges may used for this purpose. It will support agriculture thus improve rural economy, reduce poverty and increase crop productivity with the help of Agriculture students.

This is a working model if you consider kindly inform us so that from the next session we may also implement the same by inculcating in the curriculum. At present these activities are additionally arranged for students as a compulsory course curriculum namely "Community Development Activities (CDA) under University Mission Courses.

Execution:

1. University accepted the recommendation of University UBA Cell and declared all UBA activities Under **"Unnat Bharat Abhiyan** "as a community development activities (CDA) and **The Rural Agricultural Work Experience(RAWE)**. Grade will be provided to the students against these activities which will be mentioned in their mark sheet.

2. Villages namely Jharna, Keshrisinghpura, Kotjewar & Devla under Gram Panchayat- Jharna and Village- Kapadiyawas under Gram Panchayat- Gadota given their consent to help us in adoption of the land of 5-10 farmers of each villages & Barren land of Panchayat and cooperate us to achieve above mentioned targets.

Feedback forms are also filled by students quarterly and the UBA Cell will be quarterly analyze the weakness of activities and further needs.

Working Area Head

C) Education & Communication

Scope of Work:- Mentorship, Extra classes of school subjects, English communication, Moral education, Hygiene education, career counseling, awareness of education policies, Government scholarship and computer education etc.

1**-** Mentorship - The University students of education discipline will interact one to one with the students in the schools of villages to listen and solve their problems to promote better results.

2. Conduct extra classes as per requirements.

3. Seminars on moral education, First Aid, Help Aid, Hygiene, Disaster Management, Social Issues and awareness of education policies, Government scholarship & Education Loan schemes etc.

4. Computer Education will be provided to upgrade the knowledge and skills of the students.

5. Promote distance education & skill development education among villagers.

References

1. 1.http://unnatbharatabhiyan.gov.in/app/webroot/files/presentations/Presentation%20by%20IIT%20Bhubaneshwar.pdf
2. http://mhrd.gov.in/sites/upload_files/mhrd/files/PR_UBA.pdf
3. http://unnat.iitd.ac.in/app/webroot/files/general-documents/Unnat%20Bharat%20Abhiyan-DPR.pdf
4. http://www.ncri.in/Unnat%20Bharat%20Abhiyan.pdf

Research Demo: Emergent Agendas for Inclusion in Manifesto of Political Parties

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Received: January 20, 2019 Accepted: March 04, 2019

ABSTRACT: *In the Indian Democratic System and Set pattern, there seems to be a radical change in the thought and the actual exercises for the people sitting in the last row of the society. Village government to central government, in the common practices some, commitments are made to the public but is it not this in the some of theirs that written paper what they term it as Manifestoes miss some relevant items?*
Composite form of society where there is equal opportunity for all to live happy lives in the society but vehemently this system posses discrepancies of practical thought and understanding also lacks behind the vision for the all round development of the masses reside in the rural areas of the country. Election Manifestoes converges to the responsibility and accountability of all the political parties under fray of election but since Indian independence non-genuine issues pertained and reality cries aside the Democratic queen Election.

Key Words: : *Manifestoes, Rural services and Societies, Reservation, Election system, Democratic fuels.*

Introduction

India is supposed as the Country of villages where more than eighty percent of the population live .We all know well about rural development and its great importance in our country, which is the most important factor in the development of the Indian economy. Government schemes/ policies which have already been implemented with the aim of sustainable rural development need a new approach and its solid execution at the grassroots level. Government has needed to work for the upliftment of rural India to bring huge changes in the areas like health, education, agriculture, infrastructure, employment etc.

There are many scopes for improvement in the rural areas, on which we have proposed the agenda to include on the manifesto of political parties, which focus on those important points, on which the government should work vigorously for sustainable growth and development of Rural India.

Agenda for inclusion in the manifesto as follows:

Rural Public Service Commission (RPSC) should be constituted to provide jobs for rural services such as administration, health, education, and agriculture etc. with following features:

- Provide recruitment through last qualifying marks percentage merit basis for all rural community services. Merit cutoff should declare by Rural Public Service Commission (RPSC) mean 95% for Health/Administrative Services, 92% Education Services, 60% Agriculture Services etc. No requirement of conduct any separate Entrance exam or interview.
- 70 % seats reservation for Rural Domicile Candidates.
- 25 % Perks Higher than Urban Services.
- There is no transfer in the Urban Services till retirement.

Analysis and Suggestions

Use of MNAREGA Fund for development of Gram – Panchayats

- The MNAREGA funds should be given as grant-in-aid to the Gram Panchayats for developing Community Dairy farm, Food Preservation Unit, Fodder Cultivation, Manure Bank, Cold Storage, Samudayik Shochalay, Sewage Water Treatment Plant (WSTP), Manure Plant etc. 90% employees should be appointed from the respective village Panchayats so that migration could be stopped leading to eradication of unemployability.
- MBBS / BAMS / BHMS / BDS /Veterinary Medical Colleges, which has been set up in rural areas, should have only half the strength of its IPD beds compared to Urban Hospitals and against it, either minimum 10 PHCs must be opened in the rural areas or they should operate Government PHCs around nearby areas and their hospitals shall be work as Referral hospitals. They should also adopt minimum 5 Gram Panchayats to conduct Health Awareness programs, distribution of Prophylactics, Vaccination, and School Health Programs, conduct Health Check-up at least 2 times in a year for all villagers.

- Agricultural Universities should be handed over 60 hectares of barren land every year to convert into fertile land and fodder cultivation. Grants given to agricultural universities /colleges can be used for this purpose. Along with minimum 25 Gram Panchayats should be also adopted by all Agriculture universities which will support agriculture system for improve rural economy and increase crop productivity.

Teacher Education Institutions should adopt 5 to 10 schools of nearby villages to train their students so that they can work as "mentors" for the entire year to improve the weak subjects of nearby junior grade students under student Internship/Training Program as a part of their curriculum.

We are happy to share with you that the University is already working on the above mentioned purpose to meet the demand of essential services of rural communities at the university level since its inception. Our students and teaching staff are actively engaged in various awareness programs and community development programs, which come under the compulsory curriculum of the University Mission Courses, of which without obtain the credits, Degree is not awarded to the students and we got impressive results from all these activities.

It is the need of the hours to stand for the benefits of the needy and discussions be started by all the stakeholders ideas should be shared as their views on the above mentioned agenda for the better tomorrow and of our world's largest democratic country India. Author of this Research work just can only request to the intelligecia of the society to or write for a new agendas as came during our study and pass forward to the all political parties working from village to the Center so that these political parties can easily choose or include in their Vision Plan of next 5 consecutive years of serving the people of the Country. Some the Scholars have expressed their views they are below as

References:

1. Ahmed, M. (2007). Role of Biradari in Punjab Politics. The Journal of Research (Humanities), 27, 15-22.
2. Ahmed, M. (2008). Voting behaviour in rural and urban areas of Punjab [Pakistan]. Journalof Political Studies, 14, 45-56.
3. Ahmed, M. &Naseem, F. (2011). Social System Influences Political System - A comparativestudy of sub-continent. Berkeley Journal of Social Sciences, 1(1), 1-10
4. Ahmad, Mughees. (2007). Legitimacy Crises in Pakistan (A Comparative Study of Political Behaviour). Journal of Political Studies: 1-14.
5. Ahmed,Usman. (2013) . Determinants of Effective Electoral Campaign, A Research Journal of South Asian Studies :Vol. 28, No. 1, pp.107-126
6. Bari, S., & Khan, H. (2001). Local government elections: 2001 – Phase III, IV &V.Islamabad: Pattan Development Organisation.
7. Baxter, C. (1974). The People's Party vs. the Punjab 'Feudalists'. In J. H. Korson (Ed.),Contemporary Problems of Pakistan (pp. 6-29). Lieden: E.J. Brill.
8. Bélanger, J.-F. G. (2007). Economic Voting and Political Sophistication in the United States: A Reassessment. SAGE Political Research Quarterly, 541-554.
9. Bagchi, Soumendra Narain. (2013). Election Campaign, a strategin theory,Foundation Publishing House.
10. Baxter, Craig. (1971). "Pakistan Votes-1970," Asian Affairs 11: 197-218.
11. Bealy, Frank . (1999).The Blackwell Dictionary of Political Science (Malden, MA: Blackwell Publishers)
12. Black, K. (2010). "Business Statistics: Contemporary Decision Making" 6th edition, John Wiley & Sons
13. Bryman, A. (2008). Social Research Methods. 3rd edition. Oxford: Oxford University Press.
14. Burden and Klofstad. (2005). Affect and Cognition in Party Identification, Political Psychology,26,6, 869-886
15. Cameron D. Anderson and Laura B. Stephenson, Voting Behaviour in Canada (Canada:UBC Press, 2010), 3-5.
16. https://www.researchgate.net/publication/266022631_Election_manifestos_of_political_parties_and_the_right_to_information

Appointment Policy for Academicians in context to Indian Institutions

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Abstract

Government of India (GOI) should establish Teaching Methodology Institutions under PPP Module across the Country. Driving advent of an academician may convoluting him or her without any prior skill and would be saving the mechanical deliverance in the classes , as learners may not be treated as a material objects . The curricula under a defined parameter of their training should be helpful in their teaching because our faculty members have sufficient knowledge about their subjects/areas of specialization but in some or other way they do not know how to deliver lectures in the classroom, how to deal with the students in the classroom and they do not feel comfortable with IT tools and day by day developed techniques. After joining as an Assistant Professor, it should be compulsory for the candidate to be enrolled for Ph.D. within a month or within the minimum time limit in the institutions where he/she is given appointment for the post of Assistant Professor. He /she should pursue research work under the supervision of an Associate Professor or Professor working there.

Keywords: *Appointment policy, University teaching, College, Skill, Training, Methodology, Pedagogy.*

Introduction

The keen observation of the present scenario of educational system in India makes it clear that the faculty of higher educational institutions is simply lacking skills of the deliverance of knowledge in the classrooms. They have not proper knowledge of teaching methodologies because they do not obtain any training of teaching methodologies before their appointments as assistant professors. The current procedure of appointing faculty members should also be taken into account because it is simply based on unpractical policies. Besides this, the institutes of Higher Education are lacking the faculty members particularly Professors, Associate Professor and Assistant Professors, consequently, the quality of education is influenced due to lack of the teachers. Therefore, a deep discussion is the need of the hour in order to find out solution of such issues which are bottlenecks in providing proper education and the betterment of the humankind. We produce working Module to our Nation for an Open Discussion.

Appointment Policy for Academicians

Assistant Professor: A candidate should be given appointment on the post of Assistant Professor only if he/she has gained the knowledge in the following areas with minimum qualification of the Statutory Body without having NET/SLET/SET/PhD.

- For the appointment of Asst Professor of General Discipline-teaching, a candidate must have passed 2 years of Teaching Methodology Training Programme and for Assistant Professor of Professional and Technical Discipline-teaching, a candidate must have passed 1 year Teaching Methodology Training Programme based on the Pedagogy like teaching tools, education plans, psychology, preparation of lectures in the classrooms, digital and IT tools, use of library, team work, classroom management, research course work, curriculum preparation ethics, developing question Methods, soft skills, second language English, notes or book writing skills, academic administration and laboratory management.
- It should be compulsory for the candidate to register himself/ herself in the research degree Programme i. e. Ph.D. within a month at the institute where he/she is given appointment.

For this purpose Government of India (GOI) should establish Teaching Methodology Institutions under PPP Module in all over India. The curricula of their training should be helpful in their teaching because our faculty members have sufficient knowledge about their subjects/areas of specialization but in some or other way they do not know how to deliver lectures in the classroom, how to deal with the students in the classroom and they do not feel comfortable with IT tools. After joining as an Assistant Professor, it should be compulsory for the candidate to be enrolled for Ph.D. within a month or within the minimum time limit in the institutions where he/she is given appointment for the post of Assistant Professor. He /she should pursue research work under the supervision of an Associate Professor or Professor. He/she should pursue research work under the supervision of an Associate Professor or Professor in the institution.

Associate Professor: After gaining experience of 4 years of teaching as an Assistant Professor, the candidate should be promoted to the position of an Associate Professor. He/she should be promoted to Associate Professor only if he / she have completed his/her Research Degree.

Professor: After gaining experience of 6 years of teaching as an Associate Professor, he/she can compulsorily be promoted to the position of a Professor. The Professor should be given opportunity to work for full time teacher at the organization where he/she is appointed or they can switch over to other institutions of their choice but they can only serve up to the age of 50 years.

Analysis and Observations: The Government of India should from & quot Intellectual Capital of India& quot (ICI) to enlist all the Professors (above the age of 50) of India for the purpose of providing Guest Lectures, Visiting Lectures, Walk-in-Research Projects and Higher Academic Positions Like Vice-Chancellor and other Academic positions like Principal/ Director/ Proctor etc to the Higher Educational Institutions of India. A Professor can be deputed from the ICI, as per the requirement of the Higher Educational Institutions. The GOI should also offer fixed salary to all Professors of the ICI. The institution should also pay 50% of the total remuneration

of a Professor to Him / her who is called for a particular academic activity and the rest 50% of the remuneration should be deposited in the account of the ICI.

The institutions can be benefitted from the Professors who are the "Intellectual Capital of India" (ICI). In this way, qualified person particularly professors should not be treated as a Nation are entitled to get benefit of their knowledge from them. All the ICI Professor should be attached to online portal so that they can share their knowledge as per the requirement of the higher educational institutes.

After the applicability of working module, the higher educational institutions can approach to the single place i.e. ICI for the following purpose:

- For the Guest Lectures in all the disciplines, the lectures can be online or offline as per the need of an institution.
- If an institution needs a visiting faculty, it can contact to the ICI for the completion of the credits.
- For Research Supervisors/ Projects Guidance.
- For a typical laboratory work.
- For Academic Positions like Vice-Chancellor/Principal/Dean/HOD/Proctor/Provost for the fixed time duration as per the Acts and Statutes of the institutions.

If the above mentioned procedures of teaching methodology, appointment and promotion of the Assistant Professors/Associate Professors/Professors and formation of the "Intellectual capital of India" come into existence, it will improve the current educational system and heal the gap between the required teachers and current availability of teachers.

It will provide trained and skilled academic faculty members and create the "Intellectual Capital Property Hub" of Professor for institutions of all over India. It will also resolve many other issues like lack of Ph.D. candidates because NET/SLET/SET etc don't contribute to the knowledge of the candidate. After passing out the Teaching Methodology Training Programme, a candidate should be considered eligible for the post of an assistant Professor in the Higher Educational Institution where he/she will gain experience of teaching compulsorily pursue his/her Ph.D. After getting experience of 4 years of teaching along with completing his/her PhD Degree, the candidate will be given promotion to the post of an Associate Professor. In this way, the faculty will sustain at a particular institution and the problem of the faculty to switch over from one institution to another will be resolved. Some similar views which have been expressed in the work and Research of dignitaries are below for the References:

References

1. *Bansal, P. & Supe, A.N. (2007) Training of Medical Teachers In India : Need for Change. Indian Journal of Medical Science, 61(8). 478-484.*
2. *Bhuiyan, P.S. & Rege, N.N. (2001) Evolution of Medical Education Technology Unit in India. Journal of Postgraduate Medicine, 47 (1), 42-44.*

3. *Burdick, W.P., Morahan, P.S. & Norcini, J.J. (2007) Capacity Building in Medical Education and Health Outcomes in Developing Countries: the Missing Link. Education for Health [Online], 65. Available at http://www.educationforhealth.net.*
4. *Davis, M.H., Karunathilake, I. & Harden, R.M. (2005) AMEE Education Guide no.28:The development and role of departments of medical education. Medical Teacher, 27 (8), 665-675.*
5. *Duggal, R. (2006) Is the trend in health changing? Economic Political Weekly, 1335-1338.*
6. *Jolly, B.C.(2002) Faculty Development for Curricular Implementation. In G.R. Normal, C.P.M. Vleuten, & D.I. Newble, eds. International Handbook of Research in Medical Education. Dordrecht, The Netherlands: Kluwer Academic Publishers. Chapter 29, 945-963.*
7. *MacDougal, J. & Drummond, M.J. (2005) The development of medical teachers: an enquiry into the learning histories of 10 experienced medical teachers. Medical Education, 39, 1213-1220.*
8. *Medical Council of India (1997) Guidelines on graduate medical education. [Online] Available at http://www.mci.org. [Accessed February 10, 2008]. Ramani, S. (2006) Twelve tips to promote excellence in medical teaching. Medical Teacher, 28(1), 19-23.*
9. *Singh, T. (2008) Medical Education Units-an effective tool for faculty development. Proceedings of the Platinum Jubilee celebration of the medical council of India and regional workshop on "Role-Relevance and effective utilization of medical education unit in faculty development".*
10. *Supe, A.N. & Burdick, W.P. (2006) Challenges and issues of medical education in India. Academic Medicine, 81, 1076-80.*
11. *Verma, V. & Singh, T. (1995) Continuing education – concepts and strategies. Indian Paediatrics.*

Research Guru
Online Journal of Multidisciplinary Subjects (ISSN : 2349-266X)
Volume-13, Issue-1, June 2019
Impact Factor: 4.081
www.researchguru.net

NAAC: Need To Execute the Unique Sign/Symbol Post Accreditation

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Abstract It is more appreciable step of the Indian HRD ministry to do accreditation of any academic institution for the sake of the benefits of all stake holders .But some scientific logic must be applied during the assessment and at the time of accrediting the grade to the concern institution Sign/Symbol for those Institutions/Universities whose all Faculties/Departments accredited by NAAC and there need to be provision that they may be also known as Fully Accredited Institutions/Universities. Warrants of time is that there had been specific Sign/Symbol for those Institutions/Universities whom only few Faculties/Departments accredited by NAAC and they may be bound also to be known as Partially Accredited Institutions/Universities. More significantly there had been a clear provision of Sign/Symbol for those programs offered by any Institution/University which had been included in Accreditation process. . Further, Sign/Symbol for Faculties/Departments of Institution/University which had been accredited by NAAC. Nevertheless Sign/Symbol for Institutions/Universities Accredited under 4 (Four) Point CGPA Scale. And a symbolic indication like Sign/Symbol for Institutions/Universities Accredited on 7 (Seven) Point CGPA S*cale for the better entity and qualitative refection such Academic institutions.*

Keywords: *NAAC, Accreditation, Four point CGPA Scale, Seven point CGPA Scale, Institutions*

Introduction

To ensure excellence for not only quantitive but for the qualitative education among the Academic Institutions across the Country, institutions are open to ask for their accreditation by NAAC after fulfilling certain paraphernalia. It is the evident fact that evaluation is made by two tier process one by virtual assessment and another during visit to the concern institutions or universities. Parents are certain stakeholders have under illusion and there had always been a room of confusion that whether the grading had any significance highlighting for them and for their wards? During feed back by certain group of stake holders their suspicions may not be rule out tthat whether what they understand about the grading system of any accredited institutions are really as according as they meant it for?. Whether the grading these stakeholders visualize on the board of an institution are for the composite representation of such institution are only certain departments or certain Faculties have taken into the account during the assessment and accreditation process?

Variation of Parameter in the different point scales as four point CGPA Scale and seven point CGPA Scale must have a clear cut defined parameter as it does not seem very easy for any stake to differentiate between them. Data Analysis empirical formulae use in both of the pattern of assessment are identical or are different in cumulative result giving arena.

Hypothetically, if any University or any Institution get accreditation of certain department or Faculty claiming for highly intensified proclaimed grade of the University or Institution, this ideology may not be significant benefit deliverance information for the benefit group in the any democratic and welfare set up of government of a Nation.

Analysis and observation*: It is also true that* Accreditation ensures the quality of Education and it is a stamping on the quality of education being imparted at an institution/University. Accreditation provides assurance to the students for the standard High quality education which they will receive from any Accredited University/Institution. At times when thousands of Education Institutions/Universities are being intense to assure for deliver High Quality Education to their students. This is necessary to spread Authentic Information among students about All Universities/Institutions.

In this context, we would like to share our opinion with all concerning Government Bodies that it is very important an identification of each and every education Institution/University who is Accredited by NAAC and required an identification of All programs which are offered by them whether they are Accredited or Non Accredited. Carrying out a bad practice in an Education System, there are some University/Institutions which are accredited only for few Faculties/Departments and their limited programs but they mentioned Accreditation Grade on their whole University/Institution which is unethical and fully wrong practice in an Education System.

Following are the suggestions to introduce unique Sign/Symbols by National Assessment and Accreditation Council (NAAC) for identification of each accredited Faculty/Department of Institution/University and their programs.

Author of this is work is keen to request for sparing valuable time to pursue his suggestions in the same matter based on the feed back report of the stake holders of the larger intrest in the quality education in Indian higher education a system..

Conclusion:

NAAC may be requested as the need to execute the Unique Sign/Symbol :

1. Sign/Symbol for those Institutions/Universities whose all Faculty/Departments accredited by NAAC and they may be also known as Fully Accredited Institutions/Universities.
2. Sign/Symbol for those Institutions/Universities whose only few Faculties/Departments accredited by NAAC and they may be also known as Partially Accredited Institutions/Universities.
3. Sign/Symbol for those programs offered by any Institution/University which are included in Accreditation process.
4. Sign/Symbol for Faculties/Departments of Institution/University which are Accredited by NAAC.
5. Sign/Symbol for Institutions/Universities Accredited on 4 Point CGPA Scale.
6. *Sign/Symbol for Institutions/Universities Accredited on 7Point CGPA Scale.*

If above mentioned suggestions would be implemented then authentic information about University/Institutions can be provided to the students and their Parents and it

will provide a right platform to the student to choose right destination for their career path.

A good part of finance is allocated every year by the government during budgetary provision for the academic excellence in the higher intuitions and Universities, its fruits must be testy for the common and the masses without any discrimination where as it must should be some curative and progressive vision also towards the rural women education and their upliftment and elevation measures through technical and professional education. Women education giving Universities and institutions have already stamping of beauty of good education in over all respect of parameters in comparison to the other Universities or Institutions, frankly by the societies.

References

1. Aithal P. S, Shailashree V. T., Suresh Kumar P. M., 2015"a", A New ABCD Technique to Analyze Business Models & Concepts", International Journal of Management, IT and Engineering (IJMIE), 5 (4) pp 409 - 423.
2. Analysis Model for Black Ocean Strategy, International Journal of Applied Research (IJAR),1 (10) pp 331 – 337.
3. NAAC, 2013, Manual for Universities, by NAAC, Bangalore, 23/01/2013. Available inwww.naac.ac.in.
4. Reshma, P. S. Aithal, Shailashree V. T., P. Sridhar Acharya, 2015,"a" An empirical study on Working from Home: A popular e-business model, International Journal of Advance and Innovative Research, 2, 2, pp. 12 - 18.
5. Reshma, Aithal P. S., and Sridhar Acharya P., 2015,"b" "Relevance of On-line Office Administration through Working from Home in Future Education System", International Journal of Application or Innovation in Engineering & Management (IJAIEM), 4, 4.
6. http://www.naac.gov.in/images/docs/Manuals/University%20Manual%20Amended-%2020th%20June%202018n.pdf

Indian Literature is Hidden Source of Scientific Literature

Panckaj Garg

Abstract*: *India is having a rich past in terms of literature, culture and knowledge. Our ancient literature is filled with secrets and mysteries which if unveiled would do wonders. With this project we made an attempt to explore the scientific knowledge hidden in our ancient literature, bring forward the references involved in these practices and analyze its relevance in today's scenario.

Index Terms*: *Indian Literature, Ancient literature, scientific literature

I. INTRODUCTION

India is having a glorious past in terms of Literature. It is one of the ancient civilizations rich in culture and knowledge. The Indian literary tradition is the oldest in the world. It is primarily in the form of verses and essentially oral. The earliest works were composed to be sung or recited, and were so transmitted for many generations before being written down. In fact the ancient Indian literature is rich in scientific content, apart from Philosophy, Poetry etc. Most of the ancient Indian literature is written in sign languages (in the form of drawings, sculptors etc.), Sanskrit, Pali and other regional languages. Hence it is difficult for today's scholars to translate and interpret the same.

II. FOCUS AREA

A. Introduction

It is very sad that due to several reasons the world is neglecting their contribution and this rich treasure. Everyone is running towards the westernization and as a result there is a breakage of tradition in the study of ancient Indian literature and their technical details. Indian authors are also not including the ancient Indian literature as a reference and not writing the hypothesis of modern literature in correlation with Indian literature. If we don't include our Indian ancient literature as reference in our writing the title of our study/research **"Indian Literature is hidden source of Scientific Literature"** will not be justified.

B. Aims & Objective

With this project we attempt to bring forward the references mentioned in our ancient Indian literature involved in modern literature.

- To explore the scientific knowledge hidden in Indian ancient literature and analyze its relevance in today's scenario
- To recognize, discover and correlate the Indian Traditional literature and its references in Modern Literature, scientific theories, techniques and knowledge in several fields of study such as management, law, education, agriculture, medicine, mathematics, politics, life skills, life science, arts, engineering etc.
- To correlate the curriculum taught in every stream with our Ancient Indian literature in the bottom of the literature.

C. Execution

On the basis of our literature many inventions and modern literature is written. Likewise many experiments were conducted and proven by western scientists in laboratories and clinical trials. For this purpose the University starts this noble work from last two years by following the mentioned practices:

Previous Years

- Organized National conference for last two years to recognize Veda's as a source reference in Medical fields in which number of papers were presented by the students, scholars, teachers, experts and academicians nationwide.
- Developed a portal **"Dr. Garg Herbal Garden"** to correlate various medicinal plants with Modern medicine, Homeopathy and Ayurveda with the aim to provide a single source of medicine which provides different Pharmacopeia for cure of disease/symptoms.

Current Year

- ❖ Some part of the curriculum taught in every stream will be correlated with our Ancient Indian literature. The correlation of modern writing with our ancient literature is required in the bottom of particular paragraph in academic resources prepared by teachers.
- ❖ It is mandatory that all the University research (including research papers, thesis, dissertation, projects etc.) will mention the reference of ancient Indian literature.
- ❖ Developing a dedicated space on University's portal with links of ancient literature available for everyone to read and refer.

III. METHOD

(a)Modern literature: According to records, for the first time in 1672, Jean Richer and Giovanni Domenico Cassini measured the distance between Earth and Sun as 22,000 times of Earth Radii. (Earth's Radius is 6,371 Kms). **Source:**

Revised Manuscript Received on July 02, 2019.

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https://en.wikipedia.org/wiki/ Giovanni_Domenico_Cassini

(b) Ancient Literature: Ages before, in the holy book of Hanuman Chalisa in 16th century, the distance between Sun and earth computes with great simplicity. The authorship of the Hanuman Chalisa is attributed to great saint & poet Tulsidas.

Jug sahastra yogan par bhanu, liliyo taahi madhur phal jaanu!!

This means that Sun is at a distance of Juug Sahastra Yojans (Distance units in Hindi) According to following conversion practices that are in use as per Hindu Vedic Literature-

1 Juug=12000
1 Sahastra=1000
1 Yojan=8 miles
Thus
12000*1000*8= 9,60,00,000 miles
1 miles= 1.6 kms.
This implies that distance between the sun and earth is
9,60,00,000 * 1.6 kms = 15,36,00,000 Kms
Source: 18th Choupai in Shree Hanumaan Chalisa, https://www.hanumanchalisahindi.com/

(c) Proven Efforts:

May be modern literature on the basis of ancient hypothesis or translated by modern science before inventions or proven in laboratories.

IV. APPEAL TO ACADEMICIANS

It is a gentle appeal to all the academicians to study/find the original inventor of the invention and give due acknowledgment in the form of reference in their writings.

- To correlate the curriculum taught in every stream with our Ancient Indian literature in the bottom of the literature.
- During research, researchers are advised to mention source of idea generation, source of hypothesis and Original source of translation
- To use Indian traditional symbols (like swastika, om, kalash etc), hindi numbers etc. instead of other symbols (like bullet points etc.).
- To use Indian names for giving examples in their scholarly articles.
- While writing book/ book chapter, academicians are appealed to mention the reference of ancient Indian literature at the bottom of particular paragraph in their writing.

V. CONCLUSION

With this research we aim to give due acknowledgement to our ancestors who left behind them the treasures of knowledge. It is our sincere suggestion and request to academicians to make it a habit to think about the original sources of reference for their scholarly articles. If we get the reference from ancient Indian literature for our writing then we should mention that otherwise we should keep on thinking to correlate it. If all of us will start participating in this direction then in the near future the aim of this research will accomplished automatically.

REFERENCES

1. https://www.hanumanchalisahindi.com/
2. https://en.wikipedia.org/wiki/Giovanni_Domenico_ Cassini

AUTHORS PROFILE

Dr. Panckaj Garg, Founder & Advisor of Jayoti Vidyapeeth Women's University, is specialized in Homeopathy and Biotechnology. He has to his credit many research publications in the journals of repute. He is the recipient of **'Youngest Founder of a University'**, in 'India Book of Records' for being the founder of a Private University at the Young Age of 35 years. He is also felicitated with many national and international awards from eminent personalities. Recently under Author's guide ship, Jayoti Vidyapeeth Women's University, Jaipur have chosen by the Ministry of Human Resource Development (MHRD), Government of India to work on Rural Development Projects under **"Unnat Bharat Abhiyan"** and **Dr. Panckaj Garg** certified as a Participating Coordinator (P Is) of UBA Cell of this dream project of Government of India.

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No 03, MARCH 2019 ISSN No.- 9726-001X

महिलाओं की दशा और दिशा : नवीन क्षेत्र तथा समस्याओ का अवलोकन

संजय बुन्देला
शिक्षा विभाग, ज्योति विद्यापीठ महिला विश्वविद्यालय, जयपुर (राजस्थान), भारत

सारांश – महिलाओं की दशा और दिशा को परिवर्तित करने हेतु कई प्रकार के सरकारी और गैर सरकारी प्रयास हो रहे है परंतु इन प्रयासों के बावजूद महिला स्थिति प्रत्येक क्षेत्र में आशाजनक नहीं है। प्रस्तुत शोध पत्र में महिला **स्थिति** की नवीन समस्याओं को प्रस्तुत किया गया हैं।

मुख्य शब्द- शिक्षा , स्वास्थ्य, सामाजिक पारिवारिक महिला स्थिति, भारतीय अर्थव्यवस्था

प्रस्तावना

राष्ट्रीय स्वास्थ्य सर्वेक्षण की ताजा रिपोर्ट में महिलाओं को लेकर कुछ चमकदार आंकड़े दिख रहे हैं। भारत में महिलाओं के स्वास्थ्य और उनकी शिक्षा, वित्तीय स्थिति और निर्णय लेने की क्षमता में सुधार का दावा किया गया है।

विपरीत हालात के बावजूद महिलाएं निजी और सार्वजनिक जीवन में लगातार आगे बढ़ रही हैं। सर्वेक्षण के अनुसार 15 से 49 वर्ष की महिलाओं की साक्षरता दर बढ़ी है। गोवा में 89 फीसदी, सिक्किम में 86, हरियाणा में 75.4, और मध्यप्रदेश में 59.4 फीसदी महिला साक्षरता दर रेकॉर्ड की गई। वहीं प्रजनन दर यानि प्रति महिला संतानोत्पत्ति में कमी देखी गई है। ये इस बात का संकेत है कि महिलाएं अपने स्वास्थ्य और परिवार के आकार और गर्भ निरोधक प्रयासों को लेकर सचेत हैं जो कि भारत की विशाल आबादी को देखते हुए एक उत्साहजनक बात है।

वित्तीय अधिकार के लिहाज से देखा जाए तो अब प्रायः महिलाओं के खुद के नाम पर उनका बैंक खाता होता है यानि महिलाओं की वित्तीय आत्मनिर्भरता बढ़ी है। इसमें गोवा और तमिलनाडु का प्रदर्शन सर्वश्रेष्ठ रहा है। इस सर्वेक्षण में एक सूचकांक ये भी रखा गया था कि कितनी महिलाओं के नाम पर अचल संपत्ति है। दिलचस्प है कि बिहार में ऐसी महिलाओं का प्रतिशत सबसे ज्यादा था जिनके नाम पर संपत्ति थी। इसके बाद त्रिपुरा का नंबर था और पश्चिम बंगाल इसमें आखिरी पायदान पर था जहां महिला मुख्यमंत्री के हाथों में शासन की बागडोर है।

इस सर्वेक्षण के नतीजों से ये मिथक भी टूटा है कि भारत में पितृसत्तात्मक परिवार होने के कारण पारिवारिक निर्णयों में महिलाओं की भूमिका न के बराबर होती है। सिक्किम और पश्चिम बंगाल जैसे राज्यों में 70 से 90 फीसदी महिलाएं परिवार में निर्णायक भूमिका निभाती हैं। हालांकि तमिलनाडु और हरियाणा में महिलाओं की इस भूमिका में गिरावट आई है।

भारत सरकार ने सन 2001 को महिला सशक्तिकरण वर्ष के रूप में घोषित किया था। उसी साल 'राष्ट्रीय महिला अधिकारिता नीति' लागू हुई थी। अब इस नीति को नया मोड़ देने का समय आया है। इसमें युवा वर्ग की महिलाओं की भूमिका को खास तौर से रेखांकित करने की जरूरत है। पिछले पन्द्रह साल में दुनिया बहुत बदली है। बीसवीं सदी के अंतिम वर्षों में भारत के तकनीकी आर्थिक रूपांतरण के समानांतर जो सब से बड़ी परिघटना गुजरी है वह है लड़कियों की जीवन में बढ़ती भागीदारी।

भागीदारी के साथ–साथ लड़कियों के जीवन के जोखिम भी बढ़े हैं। खास तौर से दिल्ली में निर्भया कांड के बाद से स्त्रियों की सुरक्षा का सवाल उभर कर आया है। अपने घरों से निकल कर काम करने या पढ़ने के लिए बाहर जाने वाली स्त्रियों की सुरक्षा का सवाल मुंह बांए खड़ा है। बावजूद कठिनाइयों के भारतीय लड़कियों के हौसलों में कमी नहीं है। वे भी घर से बाहर निकल कर रास्ते खोजने निकल पड़ी हैं। सन 2000 के एक नेशनल सैंपल सर्वे के मुताबिक देश में 15–32 आयु वर्ग के लगभग 74 फीसदी युवा पलायन करते हैं। पलायन के लिए बताए गए कई कारणों में से प्रमुख रोजगार, शिक्षा और शादी हैं। शुरूआती वर्षों में यह पलायन ज्यादातर लड़कों का था, पर अब लड़कियां भी शहरों का रुख कर रहीं हैं। और वे भी शादी के बंधन में जल्द नहीं बंधना चाहती हैं। बहरहाल पन्द्रह साल के बाद सरकार नई महिला नीति लेकर आई है, जिस पर बदली हुई स्थितियों में विचार किया जाना चाहिए। पिछले 15 वर्षों में काफी बातों में बदलाव आया है। खास तौर से महिलाओं की जागरूकता और आकांक्षाएं बढ़ी हैं।

पुरुषों से ज्यादा बड़ी भूमिका

सामाजिक जीवन में युवा महिलाओं की भूमिका पुरुषों से ज्यादा बड़ी है। देश का राजनीतिक, सामाजिक, और आर्थिक विकास स्त्रियों के विकास पर निर्भर करता है। जब एक महिला सामाजिक और आर्थिक रूप से सशक्त होती है तो न केवल उसका परिवार, गांव, बल्कि देश भी मजबूती पाता है। सन 2011 की जनजणना के अनुसार भारत की 89.3 करोड़ आबादी गांवों में रहती है। इनमें करीबन 40.59 करोड़ महिलाएं हैं। इनमें एक तिहाई युवा महिलाएं हैं। अवसरों की कमी, कौशल न होने और अक्सर पैसे की कमी से इनकी उत्पादन

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No 03, MARCH 2019 ISSN No.- 9726-001X

क्षमता का पूरा लाभ देश को नहीं मिल पाता है। स्त्रियों के सशक्तिकरण के मोटे तौर पर संकेतक उनकी शिक्षा, स्वास्थ्य, सामाजिक पारिवारिक स्थिति और रोजगार से जुड़े हैं। भारत में इस वक्त किशोरों और युवाओं की दुनिया की सब से बड़ी आबादी निवास करती है। सामान्यतः हम 13 से 15 वर्ष के व्यक्ति को किशोर और 16 से 24 वर्ष को युवा में शामिल करते हैं। यह परिभाषा कुछ आगे पीछे हो सकती है।

भारत में इस समय उपरोक्त आयु वर्ग में 21 करोड़ से ज्यादा किशोर और लगभग इतनी ही युवा आबादी है। इस आबादी में आधी के आसपास स्त्रियां हैं। और इन स्त्रियों में 60 फीसदी के आसपास आबादी ग्रामीण है, जिसमें तेजी से बदलाव आ रहा है। युवावस्था से ज्यादा महत्वपूर्ण किशोरावस्था होती है, जो युवावस्था की बुनियाद है। उम्र का यह संधिकाल होता है, जब सब कुछ बदलता है। बच्चा एक सामान्य नागरिक बनने की दिशा में होता है, उसका शारीरिक बदलाव इसी दौरान होता (खास तौर से लड़कियों का) है। उसका व्यावसायिक जीवन इसी दौर में तय होता है।

नागरिक के रूप में अपनी जिम्मेदारियों का एहसास भी उसे इसी दौरान होता है। स्त्रियों के सशक्तिकरण के लिहाज से यह उम्र ज्यादा महत्वपूर्ण है, क्योंकि नए ज्ञान से लैस लड़कियां अपने परिवार के दृष्टिकोण को बदलने में क्रांतिकारी भूमिका निभा सकती हैं। इसलिए ग्रामीण युवा बालिकाओं का सशक्तिकरण एक प्रकार से सामाजिक बदलाव का सब से प्रभावशाली औजार साबित हो सकता है। पर लिंगानुपात बताता है कि हमारा समाज लड़कियों की उपयोगिता से बेखबर है।

समाज में महिला स्थिति

लैंगिक अनुपात से समाज में स्त्रियों की दशा का पता लगता है। सन 2011 की जनगणना के अनुसार भारत में कुल लैंगिक अनुपात 1000 पुरषों में 943 स्त्रियों का है। ग्रामीण अनुपात 949 का और शहरी अनुपात 923 का है। देश के अलग–अलग इलाकों में यह अलग–अलग है, पर सबसे खराब स्थिति हरियाणा की है जहां नवीनतम आंकड़ों के अनुसार छह साल से कम की उम्र के बच्चों का लैंगिक अनुपात 834 का है। पंजाब में 846 जम्मू–कश्मीर में 862 राजस्थान में 890 और उत्तर प्रदेश में 902 है।

लैंगिक अनुपात बताता है कि समाज स्त्रियों को किस रूप में देखता है। भारत में 0–6 साल वर्ग में 1000 लड़कों के बीच लिंग अनुपात में लडकियों की संख्या में गिरावट की प्रवृत्ति 1961 से लगातार देखी जा रही है। वर्ष 1961 के 945 संख्या के 2001 में 927 पहुंचने और 2011 में इस संख्या के 918 पहुंचने पर इसे खतरे की घंटी मानते हुए सरकार ने इसे सुधारने की कोशिशें शुरू की हैं। लिंग अनुपात में गिरावट सीधे तौर पर जन्म से पूर्व लिंग की पहचान करने वाली तकनीक के दुरुपयोग की ओर इशारा करती है। बहरहाल हाल में सरकार ने 'बेटी बचाओ, बेटी पढ़ाओ' योजना की शुरूआत की और जिसे खराब लिंगानुपात वाले 100 जिलों में प्रारंभ किया गया। सामान्यतरू जिन सूचकांकों पर ध्यान देना चाहिए उनमें से कुछ इस प्रकार हैं–विवाह के समय की औसत आयु, बच्चे को जन्म देते समय माताओं की मृत्यु, बच्चों के जन्म के बीच की अवधि, परिवार के सदस्यों की संख्या, स्त्रियों के खिलाफ अपराध, साक्षरता दर, श्रमिकों में स्त्रियों की संख्या और बाल लैंगिक अनुपात। स्त्रियों के स्वास्थ्य का जिक्र किए बगैर उनके सशक्तिकरण की बात करना उचित नहीं होगा।

फिर भी उपेक्षा

देश की लगभग 12 करोड़ युवा स्त्रियां यदि सही समय पर उत्पादक कार्यों में लग सकें तो राष्ट्रीय अर्थव्यवस्था में भारी बदलाव लाया जा सकता है। इन ग्रामीण महिलाओं को शारीरिक, शैक्षिक, सामाजिक व आर्थिक रूप से सशक्त बनाने की जरूरत है। इस साल अंतरराष्ट्रीय महिला दिवस के मौके पर 7 मार्च को दिल्ली में आयोजित एक कार्यक्रम में हारवर्ड विश्वविद्यालय से जुड़ी अर्थशास्त्री रोहिणी पाण्डे ने इस तथ्य की ओर ध्यान आकर्षित किया कि भारत में कामकाजी महिलाओं की संख्या में गिरावट आ रही है। उन्होंने दक्षिण एशिया के आंकड़ें देते हुए बताया कि यहां के पांच देशों में नेपाल, बांग्लादेश और श्रीलंका के बाद 27 फीसदी महिलाएं कामकाजी हैं। पाकिस्तान में इससे भी कम 25 फीसदी। उनका कहना था कि भारतीय महिलाओं की संख्या में पाकिस्तान की तुलना में भी गिरावट आ रही है। कामकाजी से उनका आशय औपचारिक रोजगार से है, घरेलू कामकाज से नहीं। सामान्यतरू जैसे–जैसे अर्थव्यवस्था का विकास होता है, स्त्रियां मेहनत के छोटे कामकाज जैसे खेती और ऐसे ही दूसरे कामों से हटती जाती हैं। पर जैसे–जैसे शिक्षा का प्रसार होता है और अर्थव्यवस्था में गति आती है, कामकाजी तबके में महिलाओं की हिस्सेदारी बढ़ती जाती है। पर भारत में पहिया उल्टा घुमने लगा है। यानी सन 2005 के बाद से ढाई करोड़ के आसपास महिलाएं कामकाजी तबके से अलग हो गई।

भारतीय अर्थव्यवस्था गति पकड़ रही है। घर से बाहर निकल कर काम पर जाना महिलाओं के सशक्तिकरण के लिए सबसे महत्वपूर्ण कारक है। जो महिलाएं काम करती हैं उनका विवाह जल्दबाजी में नहीं होता, बच्चे फौरन नहीं होते और उनके बच्चों में अपेक्षाकृत लिहाज से तमाम सकारात्मक गतिविधियां होती हैं। इस प्रकार के अध्ययन सामने आए हैं, जो बताते हैं कि महात्मा गांधी ग्रामीण रोजगार गारंटी योजना में काम पाने के बाद महिलाओं की स्थिति में सुधार हुआ है। हालांकि स्त्रियों के साथ आज भी कामकाज में पूरी तरह समानता का व्यवहार नहीं हो पाता है, उन्हें पुरुषों से कम वेतन मिलता है और उनकी पारिवारिक भूमिका ज्यादा बड़ी होने के बावजूद कार्यस्थल पर विपरीत स्थितियों में काम करना पड़ता

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No 03, MARCH 2019 ISSN No.- 9726-001X

है। यदि उन्हें उपयुक्त रोजगार मिले तो वैश्विक अर्थव्यवस्था में सुधार हो सकता है। अंतरराष्ट्रीय श्रम संगठन का अनुमान है कि दुनिया में आज भी स्त्रियों की 48 फीसदी उत्पादक क्षमता का इस्तेमाल नहीं हो पा रहा है। महिलाओं का रोजगार में शामिल होना उनके सशक्तिकरण के लिए जरूरी है, साथ ही अर्थव्यवस्था के विकास में भी उसकी भूमिका है। सवाल है कि देश में माध्यमिक और उच्चतर माध्यमिक शिक्षा का प्रसार बढ़ने के बावजूद महिलाओं की भूमिका बढ़ क्यों नहीं रही है? और वह कैसे बढ़ सकती है? हालांकि जल्दबाजी में कोई निष्कर्ष निकालना अनुचित होगा, पर पांच मुख्य बातों की ओर ध्यान दिलाया गया है, जिसमें कारण और निवारण दोनों छिपे हैं।

काम करने की ललक

भारतीय स्त्रियों में काम करने की ललक है और वह बढ़ ही रही है। राष्ट्रीय सैम्पल सर्वे (राउंड 68) के अनुसार 31 प्रतिशत स्त्रियां जिनका ज्यादातर समय घरेलू कामकाज में व्यतीत होता है, अब बाहर निकल कर काम करना चाहती हैं। पढ़ी–लिखी ग्रामीण स्त्रियों का यह प्रतिशत और भी अधिक यानी 50 फीसदी से ज्यादा है। काम करने की इच्छुक हर प्रकार की स्त्रियों को जोड़ा जाए तो देश में 78 फीसदी स्त्रियों की कामकाज में हिस्सेदार हो सकती है। इसका दूसरा पहलू यह है कि स्त्रियां ज्यादातर घर के आसपास काम चाहती हैं। बहुत सी स्त्रियां इसलिए काम नहीं करती, क्योंकि घर या गांव के पास नहीं मिलता। इसके साथ अवसरों की बात भी है। सन 1987 में 'ऑपरेशन ब्लैकबोर्ड' शुरू होने के बाद शिक्षकों का कोटा तय होने से महिलाओं के लिए अध्यापन का क्षेत्र खेती के बाद दूसरे नम्बर पर आ गया है। गांवों की पढ़ी–लिखी लड़कियों के लिए एक दरवाजा खुला। इधर कौशल भारत, मेक इन इंडिया, महिलाओं के लिए शिक्षा और कुछ नौकरियों में कोटा या प्राथमिकता देने की प्रवृत्ति ने युवा महिलाओं की भूमिका को बढ़ाया है। सन 2010 के बीच विनिर्माण के क्षेत्र में स्त्री श्रमिकों का प्रतिशत 15 से बढ़ कर 25 हुआ है। महिलाओं के रोजगार में सबसे बड़ी बाधा है प्रवास। यानी दूसरे गांव शहर या देश में जाकर काम करना आसान नहीं है। प्रवास मुश्किल है और हमारी सामाजिक – सांस्कृतिक परिस्थितियां पुरुषों के मुकाबले स्त्रियों के प्रवास के प्रतिकूल हैं।

राजनीतिक सशक्तिकरण

सामान्यतः राजनीति में स्त्रियों की भूमिका बहुत सीमित है। यह दुनियाभर की प्रवृत्ति है, पर भारतीय राजनीति में स्त्रियों की भूमिका और भी कम है। सामान्यतः संसद और विधान सभाओं में महिला सदस्यों की संख्या 10 फीसदी से ऊपर नहीं जाती। पर पंचायती राज ने एक रास्ता खोला है। 24 अप्रैल 1993 को भारत में संविधान के 73 वें संशोधन के आधार पर पंचायती राज संस्थाओं को संवैधानिक दर्जा हासिल कराया गया।

यह फैसला ग्राम स्वराज के स्वप्न को वास्तविकता में बदलने की दिशा में एक कदम था, पर उतना ही महत्वपूर्ण महिलाओं की भागीदारी के विचार से था। इसमें महिलाओं के लिए एक तिहाई सीटों के आरक्षण की व्यवस्था थी। यह कदम क्रांतिकारी साबित हुआ। हालांकि इस कदम की शुरू में आलोचना की गई। आज भी तमाम महिला पदाधिकारियों के नाम से उनके पति, पिता या पुत्र काम कर रहे हैं, पर ऐसी महिलाओं की कमी नहीं है, जिन्होंने सफलता और कुशलता के साथ अपने काम को अंजाम दिया है। पंचायती राज में अब दूसरी पीढ़ी की युवा लड़कियां सामने आ रही हैं।

पंचायती राज के कारण गांवों में महिलाओं की भूमिका में युगांतरकारी बदलाव आया है। अब इस आरक्षण को बढ़ा कर 50 प्रतिशत किया जा रहा है। हालांकि कुछ राज्यों में 50 फीसदी आरक्षण शुरू हो चुका है, पर हाल में केन्द्र सरकार के पंचायती राज मंत्री ने कहा कि संविधान में संशोधन के बाद इसे पूरे देश में लागू कर दिया जाएगा। सरकार ने नई महिला नीति का जो दस्तावेज जारी किया है उसका एक लक्ष्य महिलाओं का राजनीतिक सशक्तिकरण करना भी है ताकि उनके लिए ऐसा सामाजिक आर्थिक वातावरण तैयार हो, जिसमें वे अपने मूल अधिकारों को प्राप्त कर सकें। इस अधिकार को हासिल करने में युवा महिलाओं की भूमिका ज्यादा बड़ी है। हाल में कुछ राज्यों ने पंचायती राज संस्थाओं के चुनाव लड़ने के लिए शैक्षिक योग्यता को भी अनिवार्य बनाया है। हालांकि इसका विरोध भी हुआ है, पर इससे युवा स्त्रियों के लिए अवसर बढ़ेंगे। नई महिला नीति का दस्तावेज भी राजनीति, प्रशासन, लोकसेवा और कॉरपोरेट क्षेत्र में महिलाओं की भागीदारी बढ़ाने की बात कहता है।

महिलाओं के प्रति नजरिया बदलना जरूरी

युवा स्त्रियों के सशक्तिकरण की बात तब तक अधूरी है जब तक लड़कियों को लेकर सामाजिक दृष्टिकोण की बात नहीं की जाए। केवल लड़कियों की भूमिका बदलने का सवाल नहीं है, बल्कि उनके प्रति सामाजिक नजरिया भी बदलना चाहिए। उनकी सुरक्षा इसी नजरिए से तय होगी। असुरक्षित और भयभीत बालिका से हम बहुत ज्यादा की उम्मीद नहीं कर सकते। सुरक्षा का वातावरण बनाने की जिम्मेदारी पूरे समाज की है। यह काम सामाजिक शिक्षण से पूरा हो सकता है। हम परम्परा से 'यत्र नार्यस्तु पूज्यते' जैसी बात कहते जार हैं, पर व्यावहारिक रूप से इसे लागू नहीं करते। जो लिंगानुपात देश के कई इलाकों में है, वह इस सामाजिक दृष्टिकोण पर मुहर लगाता है। कहना मुश्किल है कि 'बेटी बचाओं, बेटी पढ़ाओ' का नारा हमारे दिलो दिमाग में बैठा है या नहीं। पर हम व्यवहार रूप में इसे लागू कर सकें तो कहानी बदलते देर नहीं लगेगी।

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No 03, MARCH 2019 ISSN No.- 9726-001X

समस्याऐं

हर 30 मिनट में एक बलात्कार

इन आंकड़ों की रोशनी में महिला सशक्तिकरण की कमोबेश उत्साहजनक तस्वीर बनती दिखती है लेकिन इसके स्याह पहलू को भी रेखांकित करना जरूरी है। वास्तविकता देखें तो महिलाओं के लिए अब भी भारतीय समाज में चुनौतियां बनी हुई है। भारत में महिलाएं कुल जनसंख्या का करीब 48 फीसदी हैं लेकिन रोजगार में उनकी हिस्सेदारी सिर्फ 26 फीसदी की है। राष्ट्रीय अपराध ब्यूरो के रेकॉर्ड के अनुसार महिलाओं पर होने वाले अपराधों जैसे बलात्कार, घरेलू हिंसा और दहेज हत्या में 11 फीसदी की दर से सालाना वृद्धि दर्ज की गई। ब्यूरो के आंकड़ों के अनुसार हर 20 मिनट में एक महिला भारत में बलात्कार का शिकार होती है।

न्यायपालिका और केंद्र और राज्य सरकारों में महिलाओं का प्रतिनिधित्व काफी कम है और 2013 के आंकड़ों के अनुसार सुप्रीम कोर्ट में सिर्फ दो महिला जज थीं। संसद में महिला आरक्षण विधेयक अभी भी लंबित है। पंचायतों में जहां महिलाओं के लिए आरक्षण किया गया वहां महिलाओं के नाम पर उनके पति और बेटे निर्वाचन से मिली ताकत का उपयोग कर रहे हैं। और इन सब चिंताओं के बीच यूएनडीपी की वह रिपोर्ट भी है जिसके मुताबिक महिलाओं के सशक्तिकरण में अफगानिस्तान को छोड़कर सभी दक्षिण एशियाई देश भारत से बेहतर हैं।

ताकत और दबंगई का बोलबाला

अब एक तरफ ये आकर्षक आंकड़े हैं और दूसरी तरफ इन आंकड़ों के समांतर फैला यथार्थ। यह यथार्थ बना है महिला विरोधी मानसिकता और पुरुषवादी वर्चस्व से। बेशक स्त्रियां उठ रही हैं, लड़ रही हैं, आगे आई हैं लेकिन जितना ज्यादा उनकी आवाज और उनकी शख्सियत का दायरा बढ़ता जाता है, उतना ही ज्यादा उस दायरे को सिकोड़ने की कोशिशें की जाती रही हैं। इस तरह समाज में यह वर्गीय टकराव जारी है और अब इस टकराव के हम कुछ भयावह पहलू भी देख रहे हैं, जहां ताकत और दबंगई का बोलबाला है। एक ताकतवर पुरुष ही नहीं एक ताकतवर महिला भी अपने से कमजोर और असहाय महिला पर हिंसा आजमाती दिख जाती है और इस तरह समाज का यह विद्रूप बजाय मिटने के और सघन हो रहा है।

ऐसे विरोधाभासी और प्रतिकूल हालात से निपटने का सबसे पहला रास्ता घर से ही खुलता है। जहां परिवारों को बेटियों के प्रति अधिक समानुभूति और समझदारी के साथ पेश आना होगा। उन्हें इस किस्म का आधुनिक बनना होगा कि वे बेटियों और अपने घर की महिलाओं को बराबर की जगह दें और उनका सम्मान कर सकें। उन्हें धार्मिक और सामाजिक वितंडाओं से बाज आना होगा। अगर पुरुष ऐसा नहीं करते हैं तो महिलाओं को ही यह काम अपने हाथ में लेना होगा। उन्हें श्सेकंड सेक्सश की मान्यता को हर हाल में तोड़ना ही होगा। इस काम में स्वयंसेवी संगठन, मीडिया, अदालतों, मानवाधिकार संगठन और महिला अधिकारों के लिए लड़ने वाले व्यक्ति, राजनैतिक दल और समूहों को भी अपनी प्रोएक्टिव भूमिका निभानी होगी।

जुलूस, मोमबत्ती मार्च, नारे, धरनों से आगे परिवार और समाज में मौजूद उन जटिल संरचनाओं को तोड़ना होगा जो एक कदम आगे बढ़ती स्त्री को दो कदम पीछे खींचने पर विवश करती हैं। यही वजह है कि महिला सशक्तिकरण का एक आंकड़ा राहत पहुंचाता है तो महिला पर अपराध का दूसरा आंकड़ा उसी दौरान गहरी निराशा और अफसोस में डाल देता है। **आज महिलाओ की सुरक्षा को लेकर सरकारी एवं गैर सरकारी महाविद्यालयों में विशेष प्रयास किये जा रहे हैं । महिला वर्ग सशक्त होने से ही सुरक्षा के सही मायने परिलक्षित हो पायेंगे । यह सशक्तिकरण की ओर जा पायेगी ।**

संदर्भ ग्रंथ सूची

1. राष्ट्रीय स्वास्थ्य सर्वेक्षण, 2016
2. नेशनल सैंपल सर्वे, 2000
3. जनगणना, 2011, जनगणना एवं साख्यिकी विभाग, भारत सरकार।
4. पांडे, रोहिणी, (2016), 'वर्किंग विमेन एण्ड सोशल चेंज' पेपर ऑन इंटरनेशनल वुमैन्स डे' नई दिल्ली।
5. जैन, मंजू, (1994), 'कार्यशील महिलाऐं एवं सामाजिक परिवर्तन', प्रिटवेल, जबलपुर।

ACCENT JOURNAL OF ECONOMICS ECOLOGY & ENGINEERING
Peer Reviewed and Refereed Journal IMPACT FACTOR: 7.98 (INTERNATIONAL JOURNAL)
UGC APPROVED NO. 48767
Vol.04, Issue 04, April 2019, Available Online: www.ajeee.co.in/index.php/AJEEE

खाप पंचायत की प्रासंगिकता एवं महिलाओं के अधिकार

[१]संजय बुन्देला, [२]मुनीशा शर्मा
[१,२]मानविकी एवं सामाजिक विज्ञान विभाग
ज्योति विद्यापीठ महिला विश्वविद्यालय जयपुर, राजस्थान, भारत

प्रस्तावना

खाप यानि सर्वखाप एक सामाजिक प्रशासन संस्था है, जो भारत मे उत्तर पश्चिमी राज्यों जैसे राजस्थान, हरियाणा, पंजाब एवं उत्तर प्रदेश में प्राचीन काल से चली आ रही है। समाज में सामाजिक संस्कृति, परम्पराओं, प्रथाओं, रीतियों और विश्वासों को बनाए रखने के लिए समाज में सामाजिक नियंत्रण हेतु औपचारिक व अनौपचारिक नियंत्रण संस्थाओं का गठन होता रहता है। इनमें ही एक अनौपचारिक सामाजिक संस्था ही खाप पंचायत है।

जाट समाज में इस व्यवस्था का प्रचलन आज भी है। भारत के ग्रामीण क्षेत्रों में आज भी जाति पंचायत, गौत्र पंचायत, ग्राम पंचायत होती है जो सामाजिक व्यवस्था पर निगरानी रखते हुए एक दण्ड और न्याय की संस्था में परिवर्तित हो चुकी है। खाप पंचायतें पारस्परिक पंचायतें है जो गौत्र या बिरादरी विशेष सभी गौत्र मिलकर खाप पंचायत बनाते है। एक मानक क्षेत्र गवाहंड में कई गांव होते है और इन्हीं गांवों को मिलाकर खाप पंचायत बनती है। हर खाप के गांव निश्चित होते है। विभिन्न खापों को मिलाकर एक सर्वखाप पंचायत बनती है।

हरियाणा के गांवों का इतिहास

हरियाणा के गांवों का इतिहास देखे तो ज्ञात होता है कि अधिकांश गांव गौत्र पर आधारित है। एक ही गांव एक ही गौत्र के लोगों का या कई गौत्र के लोगों के रहने के कारण उनके बीच के संबंधों को भाईचारे का सिद्धांत मान लिया जाता है। जिसके अंतर्गत यह माना जाता है कि गांव के सभी लडके और लडकियां एक दूसरे के भाई बहिन है। जिनके बीच किसी भी प्रकार का रिश्ता एक अपराध है। यह स्पष्ट करना मुश्किल है कि ३६ बिरादरी वाली खाप पंचायत कैसे वर्तमान में जाटों तक ही केन्द्रित हो गई है। वर्तमान समय में प्रचलित अधिकांश खाप पंचायत के मुखिया चौधरी के नाम से ही जाने जाते है।

चौधरी जाटों का सम्मानित पद होता है। जो खाप पंचायतें अन्याय के विरूद्ध आवाज उठाने के लिए जानी जाती थी आज वही सगौत्र विवाह और ऑनर किलिंग जैसे गंभीर मुद्दों मे फंसती जा रही है। खाप पंचायतों का इतिहास १३५० वर्ष पुराना है। खाप दो शब्दों से मिलकर बना है ख और आप। ख का अर्थ है आकाश और आप का अर्थ है जल अर्थात् जो सब जगह आकाश की तरह व्यापक और जल की भांति निर्मल है। आज जाटों की करीब ३५०० खाप अस्तित्व में है। पाल या खाप का क्षेत्र निर्धारित होता है। हर गांव के गांव निर्धारित होते है। जैसे बडवासनी बारह के १२ गांव, कराला के १७ गांव, चौहान खाप के ५, तोमर खाप के ८४ गांव, दहिया चालीसा के ४० गांव, पालप खाप के ८४ गांव, मीतरोल खाप के २४ गांव तथा सर्वखाप में २२ गांव शामिल है।

यह फरीदाबाद, बल्लभगण से लेकर मथुरा जिले के छाता, कोसी तक फैला विशाल संगठन है। इसमें करीब १००० गांव है। इस खाप में कोसी की डीडे पाल, कामर की बेनीवाल पाल, होंडल की सोंरोत पाल, पैगांव की रावत पाल आदि शामिल है। यह पाल दहेज निवारण में सबसे आगे है। इस तरह खाप पंचायते रामायण काल से महाभारत काल और मौर्य काल से हर्षवर्धन के काल तक देखने को मिलती है। मुगल शासन से होते हुए आज भी इनका अस्तित्व कायम है। खाप पंचायतों को समाज सुधार, लोकतंत्र में ग्राम स्वराज, प्रशासनिक व्यवस्था में ग्रामीण स्तर पर प्रशासन, प्रबंधन, स्वास्थ्य, शिक्षा, विकास आदि के लिए बनाया गया था। वर्तमान में यह खाप वक्त के साथ बदल नहीं पा रही है। इनमें सुधार की जरूरत है।

यह खाप पंचायतें आज भी यांत्रिक एकता पर कार्य करती है और परम्परागत रूप से विधि विधानों को मानती है। ऐसे में एक तरफ यह संस्कृति बचाने की बात तो करती है परंतु दूसरी तरफ समाज में खौफ, महिलाओं का शोषण आदि समस्याओं को जन्म देती है। खाप प्रणाली में कई विभाजन और उपविभाग हैं, और उन्हें एक श्रेणीबद्ध क्रम में व्यवस्थित किया जाता है, और ये सभी व्यक्तिगत संरचनात्मक इकाइयां सामूहिक रूप से एक खाप का गठन करती हैं। एक परिवार एक खाप की एक बुनियादी इकाई है और परिवारों का एक समूह मिलकर कुनबा का गठन करता है। खाप की अगली सूत्रधार इकाई थीला या थूला है जो आगे कई कुनबों का समूह है। थोलस का एक समूह पन्ना का गठन करता है।

पन्ना को हरियाणा के गाँवों में कुछ अन्य नामों से भी जाना जाता है जैसे पट्टी, बगरह, बघी, आदि। इस पदानुक्रम में अगली इकाई गाँव है। जाट गाँव जो कुछ पन्नो से जुड़कर बने है। पास के गाँवों के एक समूह को गावंड के नाम से जाना जाता है। एक खाप की अगली और उच्चतर प्रारंभिक इकाई टप्पा है जिसमें कई गाँव शामिल हैं और खाप की एक महत्वपूर्ण इकाई है। थापा, पन्ना और टप्पा, खाप की इन सभी इकाइयों ने एक बार राजस्व इकाइयों के रूप में काम किया है। अकबर के शासनकाल के दौरान, उनके राजस्व मंत्री टोडरमल ने लगभग पूरे उत्तर भारत को कई प्रशासनिक हलकों में विभाजित किया, जिन्हें परगना कहा जाता था और एक परगना के भीतर अलग—अलग तपस थे और ये तपस जाट वंशों के वितरण के अनुसार गठित किए गए थे।

मुगल के दौरान १० नियम, इन तपों का गठन किया गया था, और हो सकता है कि बाद में इन तपों से संबंधित लोग खाप का गठन कर एक बैनर के नीचे एकजुट हो गए। इस प्रकार एक विशेष खाप का गठन करने वाले तपस एक विशेष जाति और गोत्र से संबंधित हो सकते हैं या अलग—अलग कुलों और अलग—अलग जातियों से संबंधित तपस ने भी एक सामान्य उद्देश्य को प्राप्त करने के लिए खाप का गठन किया हो सकता है।

खाप पंचायत का महिलाओं के अधिकारों पर प्रभाव

खाप पंचायतों के कारण महिलाओं के विरूद्ध हिंसात्मक व्यवहार लगातार बढ़ रहा है। मुजफ्फरनगर और बागपत दोनों क्षेत्रों में महिलाओं पर घरेलू हिंसा, बलात्कार, शैक्षिक व सामाजिक, आर्थिक अत्याचार, ऑनर किलिंग बढ़ती जा रही है। इसके साथ ही हरियाणा में आज भी कन्या हत्या, कन्या भ्रूण हत्या सामान्य बात है। साथ ही खाप पंचायतें इन क्षेत्रों में अपने नए नए फरमान जारी कर रही है। लड़कियों को मोबाइल फोन इस्तेमाल नहीं करने दिया जाता, आधुनिक कपड़े लडकियां नहीं पहन सकती, लडकियां बिना पुरूष सदस्य के घर के बाहर नहीं जा सकती, लडकी अपनी मर्जी से विवाह और शिक्षा का अधिकार नहीं ले सकती।

लडकियों को बाहर काम करना मना है। ऐसे माना जाता है कि खाप पंचायतों का काम संस्कृति की रक्षा करना मात्र दिखावा है। यह पंचायतें मात्र पुरूषसत्तात्मक समाजों का प्रतिनिधित्व करती है। जिसमें एक महिला को कैद करके उसका शोषण करना ही एकमात्र उद्देश्य उजागर होता है। ग्रामीण क्षेत्रों में महिलाओं को उनके बच्चे निर्धारित करने का अधिकार नहीं है। वे प्रशासनिक और राजनीतिक अधिकारों, प्रक्रियाओं से अनजान है। अधिकतर महिलाऐं सामाजिक मान्यताओं, सामाजिक अंत:क्रियाओं पर प्रतिबंध, असुरक्षित और हिंसक वातावरण के कारण अपनी आवाज नहीं उठा पाती।

ऐसा नहीं है कि शहरी महिलाओं की स्थिति ग्रामीण महिलाओं से बहुत अच्छी है लेकिन खाप पंचायतों ने ग्रामीण महिलाओं की सांसों तक पर अपना अधिकार समझ रखा है। हरियाणा में खाप पंचायतों के कारण ही लिंगानुपात तेजी से गिर रहा है। हरियाणा में महिलाओं के खिलाफ अत्याचारों का ग्राफ बढ़ रहा है। खाप पंचायतें सामाजिक संस्थाऐं परंतु इन पर कठोरता से रोक लगाई जा सकती है। वहीं खाप पंचायतों को भी अपनी भूमिका का मंथन करने की आवश्यकता है। महिलाओं के विरूद्ध हिंसा एवं खाप पंचायतों की प्रासंगिकता में सकारात्मक संबंध है। स्थानीय खाप पंचायत महिला की स्वतंत्रता पर प्रतिकूल प्रभाव डालती है। यह जरूरी है कि खाप पंचायतों के तानाशाही फरमान का उन्मूलन कर महिलाओं को स्वतंत्र रूप से जीने की आजादी दी जाए।

महिलाओं को लेकर परिवार, समाज और खाप पंचायतों को अपनी सोच बदलने की आवश्यकता है। आधुनिकता हमेशा ही संस्कृति को हानि नहीं पहुंचाती है। आधुनिकता को परम्परागत संस्कृति से मेल करवा कर स्वीकार किया जा सकता है और यह आवश्यक है क्योंकि बिना शिक्षा, अधिकार, स्वतंत्रता के महिलाऐं यदि आगे नहीं बढेगी तो यह राज्य और देश के विकास में एक धब्बा है। खाप पंचायतों को महिलाओं के पहनावे, खान पान, शिक्षा, विवाह, आवागमन, मोबाइल आदि जैसे निजी अधिकारों से दूर करना भी आवश्यक है। निगरानी करना एक आवश्यक कार्य है जो खाप पंचायते कर सकती है परंतु फरमान जारी कर तानाशाही करने का अधिकार भारत का संविधान उन्हें नहीं देता है।

REFERENCES

1. Hindustan, Meerut 31 March 2010, P-2
2. Amar Ujala 31 March 2010, P & 9
3. http://www/azadindia.org/social-issues/khap-panchayat-in-india.html
4. http://beta.thehindu.com/opinion/lead/article424506.ece?homepage=true
5. http://en.wikipedia.org/wiki/Khap#Functioning_of_Khaps
6. yahoo India News 1st Jan-Jagran
7. Rediff News, Divided UPA to form GoM on Khap Panchayat issue, July 08, 2010.

Research Guru
Online Journal of Multidisciplinary Subjects (ISSN : 2349-266X)
Volume-13, Issue-2, September-2019
www.researchguru.net
Impact Factor:4.081

Sun in ancient literature and Powerful heat Emission by Black Hole

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Abstract: Process of fission and fusion is the continuous process inside the Stars. Atoms of Hydrogen is converted into Helium and vice –versa. Under thermonuclear reaction inside the atom may contraction continuing without end beyond the event horizon and interestingly left is nothing but a generation of gravitational field so intense that no matter or signals of any kind may be allowed to escape to infinity and bring information about the fate of the collapsing matter. Body fallen deep inside the event horizon evolves energy magnitude . Different layers on the surface as Event horizon is one way membrane in an undefined shape. Fuel burn inside it further gravitational field becomes too powerful that nothing can escape outside from there. Explicitly light emitted at any point inside the event horizon is dragged inward irrespective of the direction of emission. Fusion process may leads to light, emitted at any point outside the event horizon can escape to infinity effects heat

Keywords: Black hole, Energy, Pulsar, Gravitation, Emission

INTRODUCTION: HEAT LAYER IN A STAR

For Collapsed objects like white dwarf and neutron stars. There had been credible evidences for the existence in some of the cases direct observation had been witnessed of a large number of collapsed objects like neutron stars or black holes inside our own galaxy. Their number is most likely larger than ten to the power eight .According a study , the collapsing core has a mass greater than 3 MΘ to begin with its collapses cannot be halted to settle down to a neutron star equilibrium configuration they can. Here the contraction would continue without end beyond the event horizon and ultimately what is left is nothing but a gravitational field so intense that no matter or signals of any kind are allowed to escape to infinity and bring information about the fate of the collapsing matter present in our galaxy .

Moreover, there had been an established fact that powerful radiation emission can take place after swallowing of mater by a black hole till the end of their complete collapse. Not only in India, Astrophysicists are convinced that X-rays comprise the most significant observable emission from the velocity of a black hole. Contrast to the prevailing facts that one of the few ways in which X-rays can be produced is by mass accretion onto collapsed orbits specially black holes. A mass accretion can take place in various ways leads energy. Gravitational collapsing and accreting mass may be falling radically or spiraling down on isolated black hole system. No need to say so far as the observational aspect is concerned, the good way to infer about the existence of black hole is to capitalize on a double-star system on accreting pattern and the missing companion is suspected to be a Black hole and is so near to a normal star that it draws in matter from its companion. Flow from one star to another is well known in close binary system and a strong emission in the X-rays region is expected if one of the components is a neutron star or a black hole. For such a binary system, material flowing from one star would have too much angular momentum to be able to fall directly on to a compact companion. It would instead from a spinning disc, in which the matter spirals inward. The energy liberated by the disc could again emerge as X-rays.

OBSERVATION AND CALCULATION :

Without any loss of generality , let us see the accretion of mass of an isolated black hole. It has been a clear fact that in the cases of Kerr black hole, there exists just outside the ergo sphere a circular orbit r=(3+)m/2 where $r=r_{ms}$, $r=r_{mb}$ and $r=r_{ph}$ coincide. Means, it is recognized that at this distance, the infilling gas due to dragging of inertial frames will be swung into orbital rotation about the hole. Its angular velocity, then, can be

obtained (with negative sign). This is given for maximally rotating holes,

$$\Omega = \frac{m + \sqrt{mr}}{(r + m)\sqrt{mr + r^2 m^2}}$$

and

$$\Omega]_r = \frac{3+\sqrt{5}}{2} + m\,\underline{\Omega}\,\frac{1}{5m}$$

The binding energy in the orbit is given by,

$$^{E}bind = 1-E/\mu\,\underline{\Omega}\,0.14$$

Heat evopartion and continuous radition further puts forwards to radiation, the particle may lose its energy and then it would gradually spiral inward through the ergo sphere to settle down to the last circular orbit near the horizon. Momentum may not be halted , the gas approaches the horizon, its angular velocity as seen from infinity must approach the angular velocity of the horizon for (a = m).

$$\Omega = \Omega \text{ horizon } 1/(2m).$$

Some facts may be understand from the following Table :

Table

ρ = 1.5, $-5.91m < \lambda < 4.91m$

λ	−5.9m	−3.9m	−1.9m	.1m	2.1m	2.8m	3m	4.1m
+Z	3.77	3.15	2.52	1.9	1.28	1.06	.99	0.65

Sprillalying the conclusion, as the particle spiral down from r=(3+√5)m/2 to the last circular orbit r = m, there are marked and abrupt changes in the frequency shift of omission. Thus, the particle falls from the orbit r= (3+√5)m/2, there is slight decrease in the value of the frequency shift but it abruptly increases as r = 2m. It is concluded that the region near r =(3+√5)m/2, is a region of increased activity where there is supposed to be probability of maximum heat radiation. Recognized as increase is more of abrupt for values of r less than 2m. There is fantastically high spread in (1+Z) among the photons emitted at small value of r near r = m. Thus the consistent with the strong gravitational field in that region. At values of r greater than (3+√5)m/2, the frequency shift decreases slowly. If we examine, it becomes clear that frequency shift of emitted radiation is greater than 1 for values of impact parameters in the range of $-7m < \lambda < 2m$.

Now, we come to the case of slowly rotating isolated black hole. Accretion of a photon or a particle to a black hole may occur broadly in two ways. A particle falling into the black hole or it may occur broadly in two ways. A particle falling into the black hole or it may be that on approaching the hole, it gets deflected. The particle that goes in and gets caught gives energy and angular momentum to the black hole. If the particle going in and gets deflected by the hole, it picks up energy and angular momentum from the whole. A particle entering the ergo sphere, if it is properly powered, can escape to infinity. A real particle in the ergo sphere must always change its position regardless of whether it eventually escapes to infinity or enters the event horizon to collapse. From the ergo sphere a particle can always send a signal out to infinity. The dynamics of the geometry of the ergo sphere can be probed in the case of Kerr metric. Penrose have shown that it is possible to extract energy out of the zone. For this purpose, he has suggested the following steps :

(a) A small object with rest plus kinetic energy E1 is shot into this region.

(b) It is allowed to explode (or turn) on its rocket engine) in such a way that that the disintegration product (or, equivalently, the rocket ejects) crosses the event horizon and gets accreted to the hole.

(c) The residual mass is allowed to re-emerge from the surface of infinite red shift with total energy E2.

(c) The process is so arrange that E2 exceeds E1.

Here, the energy E2-E1 can be said to have been extracted from the rotational energy of the black hole in the sense that angular momentum of the black hole always decreases in such a process. If the "energy gain process" is repeated again and again, the black hole will be losing its angular momentum. The rotation of the black hole will be slower and slower and (a/m)→0. In the equatorial plane, the one way membrane (event horizon) expands and coalesces with the infinite red shift surface, wiping out the ergo sphere. The Kerr metric in the limit reduces to the perturbed Schwarzschild metric. It appears from the orbits just outside the ergo sphere in the limit settles down to orbits given by respectively outside the event horizon of the perturbed. There is also another way of obtaining this perturbed metric. For the orbits given by the angular velocity of orbital rotation and the binding energy are:

$$\Omega \; a/5.72m,$$

$$^{E}bind \;\; \rightarrow 0.18$$

Thus, a particle spiraling in from r = ∞ towards a black at the last circular orbit at r = 2m(1+a) radiates a fraction 1 -√2/3 or 18 percent of the rest mass. In the case of particle spiraling in a maximally rotating Kerr black hole radiates 42 percent of the rest mass before arriving at the last circular orbit.

Now we proceed to investigation the frequency shift of radiation emitted near the orbit. We get from

$$2mr(L-aE)^2 = K^2E^2r^2\,(r^2 + a^2),$$

and $$(k^2 + 1)E^2(r^2 + a^2) = L^2 + \Delta\mu^2,$$

Equation is so transformed as

$$(\sqrt{2}m)\,(L/E) = \sqrt{2}ma + K\;\sqrt{r}(r2 + a2)$$

Substituting for k, we get

$$\lambda = a \; + \frac{r\sqrt{r}}{\sqrt{3}r - 2m}$$

Substituting a = mα and r = 2m (1+α)and neglecting terms containing α2 and higher power of α, we get $\lambda \quad \lambda = m\,[\sqrt{}2+\{(3/\sqrt[2]{2})+1\}\alpha]$

Again, making the substitution a = m and r = 2m(1+α) and approximating by neglecting α2 and higher powers of α, we get -

$\lambda_1 = -m[4 + 3\alpha]$ and $\lambda_2 = m[4 + \alpha]$

Then for outgoing photons emitted near $r=2m(1+\alpha)$ to escape, λ must satisfy the condition -

$$\underline{\lambda_1} < \underline{\lambda} < \underline{\lambda_2}$$

We can say that for the outgoing photons to escape, λ can have the following values,

$\lambda = -m(4 + k\alpha)$, where $k<3$,

or, $\lambda = m(4 + k_1\alpha)$, where $k_1<1$, For the frequency shift for the first set of values, we get from by making approximation as in the following expression:

$$1+Z = \frac{0.18(4 + 20\alpha + 3\sqrt{2\alpha})}{4\alpha}$$

For the values of λ given above

$$1+Z = \frac{0.18(4 + 20\alpha + 5\sqrt{2\alpha}}{4\alpha}$$

For the desired value

It can be easily be verified that for a frequency shift greater than 1, $\alpha<0.23$. As a becomes smaller and smaller, it can be easily verified becomes higher and higher. For the ingoing photons the emitted radiation will escape if $\lambda > m(4+a)$ or $\lambda = m(4+k_2\alpha)$ where $k_2>1$. We get for frequency shift an expression which is same.

Hence, we conclude that in the black hole represented by the perturbed metric, it is possible for the particle in the last circular stable orbit $r=2m(1+\alpha)$ to emit radiation which can escape to infinity. The binary system, gas can flow from the atmosphere of the ordinary star into its companion hole. Also a super massive hole $(10^7 M\Theta \lesssim M \lesssim 10^{11} M\Theta)$ at the centre of a galaxy, due to its high mass and the large gas density accretes much more than a hole of ordinary mass in a normal interstellar region. The accreting gas in a binary system and in the center of a galaxy has very high specific angular momentum. Hence, the accretion is far from spherical. Instead of falling inward radically or roughly radically, the gas elements go into Keplerian orbits around the hole, forming gas disc analogous to Saturn's rings. However, the density in accreting disc is far greater than the density in Saurian ring. The presence of viscosity in accreting disc removes the angular momentum permitting the gas to spiral gradually into the hole. Viscosity also heats the gas which causes it to radiate and this radiation is largely the X-rays in binary system and ultraviolet and blue light in super massive holes. The angular momentum

removed by the viscosity is transported by viscous stresses from the inner part of the disc to the outer part and then carried away by passing gas. The total energy radiated by a unit mass of gas during its passage inward through the disc is approximately equal to the gravitational binding energy of the unit mass when it reaches the inner edge of the disc. For a black hole, the inner edge of the accreting disc is at the last stable circular orbit. We have seen that in the case of maximally rotating Kerr black hole, there exists a stable circular orbit r_{ms} = (3 +√5)m/2, just outside the ergo sphere. Hence, it is just possible that the accreting gas first forms a disc with its inner edge at the circular orbit r = (3 +√5)m/2, where its binding energy is given by,

$$E_{bind} \sim 0.14$$

Here the presence of viscosity in accreting disc will remove a part of the angular momentum permitting the gas to spiral through the ergo sphere, the angular momentum of the gas spiraling through the ergo sphere is still high enough.

Hence, the gas elements go into Keplerian orbit to form a disc with its inner edge at the last circular orbit. The binding energy there is given by,

$$E_{bind} \sim 0.42$$

Here also the presence of viscosity will remove the remaining angular momentum and the gas finally falls in the hole.

Now we consider the black hole represented by the perturbed metric. In this case also the accreting disc will be formed with inner edge at the last circular orbit r_{ms} = 2m(1+X). The binding energy is given by:

$$E_{bind} \sim [\sqrt{2}/3][1 + (\alpha/8\sqrt{2}].$$

Here, X is a variable would be denoting different real values as the configuration of different energy level and layer of heat. The orbital period in this case is greater than the period in case of maximally rotating Kerr hole and also in the case of non-rotating hole. P_{min} in these cases are given as follows:

$$P_{min} = 12\pi\sqrt{6}m, \quad \text{for non-rotating hole.}$$

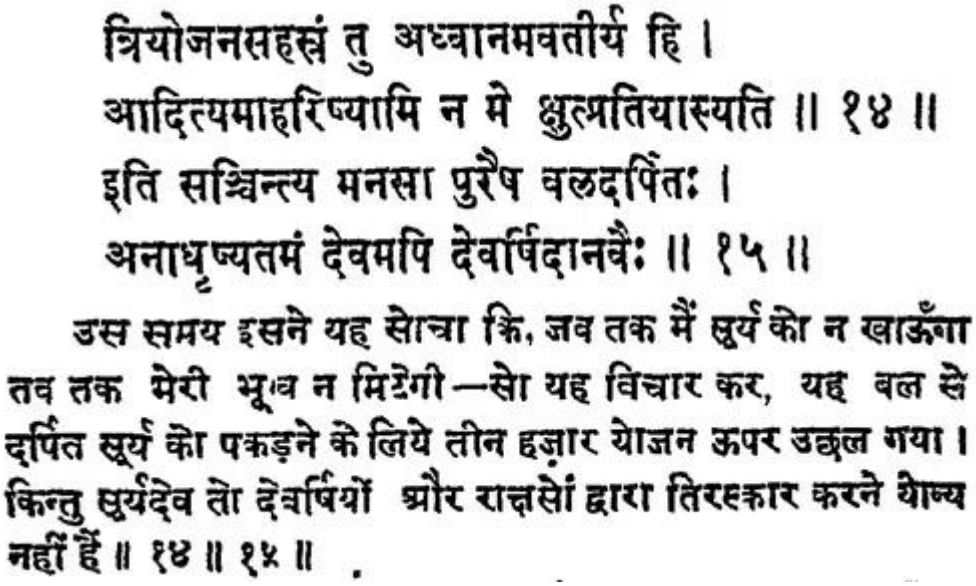
$$P_{min} = 4\pi m, \quad \text{for maximally-rotating hole.}$$

Renowned scientist , Swanyaev has given a test for rotation of the black hole as follows:

"A black hole is non-rotating if $P_{min} = 12\pi\sqrt{6}m$ or rotating if $4\pi m \lesssim P_{min} \lesssim 12\pi\sqrt{6}m$. It appears that test particle falls in case of slowly rotating black hole represented by the perturbed metric represented.

Lastly, it appears that the circular orbits near the event horizon of the perturbed metric can explain the formation and nature of rings round the Saturn And other planets in our galaxy.

Facts from Ancient Indian Literature: Identification Principle of God and the BRAHMA of the Hindus, and MITHRAS of the Persians, and ATHOM, AMUN, PHTHA, and OSIRIS, of the Egyptians, the BEL of the Chaldeans, the ADONAI of the Phœnicians, the ADONIS and APOLLO of the Greeks this quite becomes a spiritual fact but personifications of the Sun, the regenerating Principle, image of that fecundity which perpetuates and rejuvenates the world's existence that is supposed as the huge source of Energy as a star in our Glaxy One of the Stars as sun is very important in the Vedas Ancient Iranian literature. This star is known by the Vedic hymns namely Sūrya and Savitr. Here beginning first name occurs exclusively, sometimes they are used interchangeably and sometimes they are used as though they represent quite distinct celestial object. Here customary supposition had been that Savitr is referred to the Sun when it is invisible; while Sūrya refers to it when this is visible to the millions of worshippers. According to a published paper the s un is the name of an ancient Iranian god and it is the name of a "Yazata" in the Avesta book. The Avestan form of this word is "Hvarexšaeta" (Hvarekhshaeta) and it is said "Xvaršēt" in the Pahlavi texts, and "Xoršid" (Khoshid) in the Persian. The Sun from a long time ago was praised by Aryan people and ancient Iranian even before Zoroaster. Moreover Greek Historians have written something about Iranian who respected the Sun and Sun shine. Like is the contraction process of a star as white dwarf, red giant, neutron star for the same division of a star.



त्रियोजनसहस्रं तु अध्वानमवतीर्य हि ।
आदित्यमाहरिष्यामि न मे क्षुत्प्रतियास्यति ॥ १४ ॥
इति सञ्चिन्त्य मनसा पुरैष बलदर्पितः ।
अनाधृष्यतमं देवमपि देवर्षिदानवैः ॥ १५ ॥

उस समय इसने यह सोचा कि, जब तक मैं सूर्य को न खाऊँगा तब तक मेरी भूख न मिटेगी—सो यह विचार कर, यह बल से दर्पित सूर्य को पकड़ने के लिये तीन हज़ार योजन ऊपर उछल गया। किन्तु सूर्यदेव तो देवर्षियों और राक्षसों द्वारा तिरस्कार करने योग्य नहीं हैं ॥ १४ ॥ १५ ॥

Courtesy: Valmiki Ramayan ,yudh kand(28|14-16

ACKNOWLEGMENT: Author is indebted to Sir Dr.Panckaj Garg, visionary Founder and Advisor of Jayoti Vidyapeeth Women's University,Jaipur, youngest founder of a University in India declared by India Book of Records for his mentorship to attribute the richest Indian Ancient Literature highlighting Indian past glory in every Research under the Esteemed University.

SUGGESTED READINGS

1. R.A. SUNYAEV, Astron, A.J.(U.S.A.), 16, 941(1973). Translation of Astron (U.S.S.R.) 49, 1153(1972).

2. A.F. HWANG and J.J. DYKLA, NUOVO CIMENTO B(ITALY), 158, 210(1973).

3. MARK DAVIS, R. RUFFINI, W.H. PRESS AND R.H. PRICE, Phys. REV. LETTERS 27, 1466(1971).

4. P.C. PETERS and J. MATHEWS, Phys. REV. 131 435(1962).

5. F.J. ZERILLI, Phys. REV., D2 2141(1970).

6. F-de. FELICE, L. NOBILI and M. CALVNNI, Astron & Astro. Phys. 30, 111(1974).

7. S. NEWMAN and R. PENROSE, J. MATH, Phys.3, 566(1962).

8. R.P. KERR, Phys. LETTERS, 11, 238(1963).

9. R.H.BOYER and R.W.LINIQUIST.J-MATH,Phys.8,265(1967).

10. D. CHRISTODOULOU and R. RUFFINI, Black Holes.

Edited by C.De WITT and B.S. Dewitt (Gordon and BREACH Science Publishers, New York, 1972) Appendix 4.2, P. R. 151.

11. A. TRAUTMAN, F.A.E. PIRONI and H. BONDI, Lecturers on General relativity(1964).

A call to (green) arms: Synthesis of Acetals and cyclic Acetals with and without Solvents - A comparison

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Abstract: **The scope of green chemical synthesis and failure of conventional methods in synthesis of organic compounds has been examined. Green solvents (like-DMSO, DMF, Water) and green methods were chosen as model to determine suitable conditions of the reaction. In microwave synthesis a solvent-free reaction or in presence of universal solvent (water), the product 2-methyl-2, propyl dioxolane was obtained with high yields 87% and 88% respectively. The protonic acid (HCl) was the preferred choice as a catalyst and support to keep the reaction medium under mild and neutral conditions.**

Index Terms**: Green chemical synthesis, Alternative solvents, Non-corrosive, High yields, Stable to reaction conditions**

INTRODUCTION:

An organic compound is defined as any compound whose molecules contain **carbon** and **hydrogen** (hydrocarbons) and compound that is derived of it. Due to carbons ability to catenate, millions of organic compounds are known. It is difficult to study these millions of organic compounds together. Therefore, these organic compounds are divided and further sub-divided into different classes for an ease. It includes one of the classes of heterocyclic compounds.

Various compounds such as alkaloids[1], antibiotic, essential amino acids[2], vitamins, harmons, haemoglobin and large number of dyes[3] and synthetic drugs[4] contain hetero cyclic ring systems.

Substituted cyclic acetals are important intermediates in organic synthesis and are widely used as solvents, plasticizers, surfactants, etc.[5]. 1,3-Dioxacyclo-alkyl moiety is often present in complex molecules having biological activity[6]. Protection of carbonyl function as acetal is known to be the widely used synthetic route for the manipulation of various multifunctional organic molecules [7]. Acetals can also be used for C-C bond formations [8], synthesis of ethers [9], esters [10], and cyclization of diynes [11] (Fig.1). Additionally acetals have enormous industrial importance due to their potential utility as flavoring agents in distilled beverages, diesel additives and plastic materials [12].

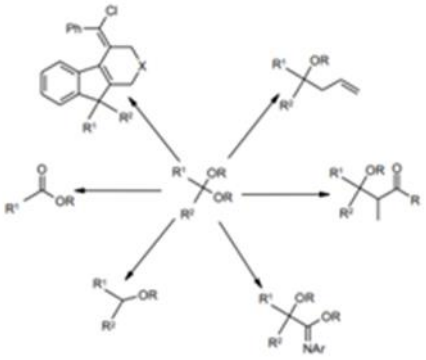


Fig.1- Uses of Acetals

1.1 Acetals and Cyclic Acetals

An acetal is an organic molecule where two separate oxygen atoms are single bonded to a central carbon atom [13].e.g.

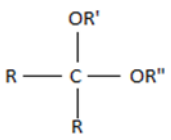


Fig. 2 - Structure of Acetal

A cyclic acetal is an acetal in the molecule of which the acetal carbon and one or both oxygen atoms thereon are members of a ring [14].Example,

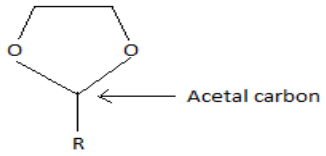


Fig. 3 - Structure of Cyclic Acetal

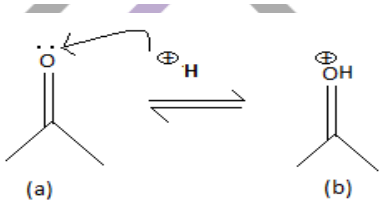
Formation of Acetals

Acetals are formed by aldehydes and ketones which reacts with alcohols or diols in presence of acid catalysts. Acid catalysts are acids that speed up the rate of a reaction. As catalyts are never eaten alive in a chemical reaction, they simply play the role as a super boost, ensuring the reaction reaches completion in record time.

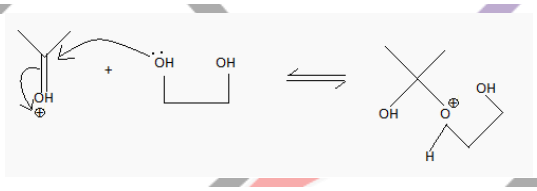
1.2. Mechanism of formation:

There are seven steps involved in acetal formation.

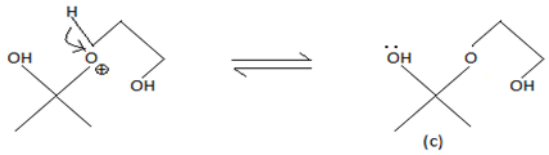
Step 1:- Protonate the carbonyl group on the ketone molecule (a) using the proton from an acid catalyst. Protonation refers to the transfer of a proton (H) to a molecule or atom in order to form a bond.



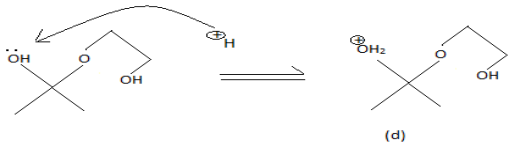
Step 2:- Take andiol and use it to perform a nucleophilic attack on the product formed in step one (b). A nucleophile is a species that graciously donates its electron pair in order to form a chemical bond.



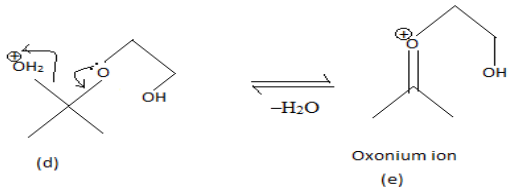
Step 3:- Deprotonate, or remove the proton (H), the product formed in step three, is an hemiacetal (c). A hemiacetal is a molecule formed when an diol is added to an ketone.



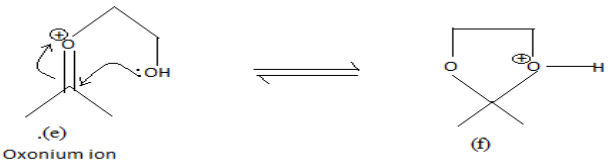
Step 4:- Take hemiacetal and protonate the alcohol group using the hydronium ion.



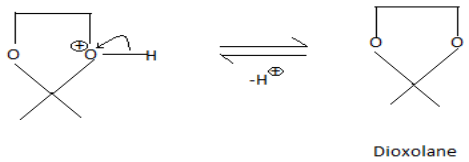
Step 5:- In this step, due to unstable charge water molecule bump off the product. To make stabilize the product (d) moves the electron pair from other oxygen molecule.



Step 6:- The lone pair of other oxygen atom of diol move on to the carbocation formed when double bond moves on former oxygen atom to complete its valency. This results in cyclisation of the product (e).



Step 7:- In the final step,deprotonation of the final product (f) takes place. The so-called product is dioxolane.



1.3. Qualities of a good protecting group in organic synthesis

A good protecting group should be such that –

(a) Simple to put on, in high yield.

(b) Stable to reaction conditions.

(c) Easy to remove, in high yield.

Protecting groups are more commonly used in small-scale laboratory work and initial development than in industrial production processes because their use adds additional steps and material costs to the process [15-17].

1.4. Application of dioxolane and its derivatives and protection of carbonyl group

-The reaction type i.e. protection of carbonyl compound is used in the total synthesis of many of the natural products such as - Total Synthesis of **Cholestrol**, **Geraniol**, etc.

-Dioxolane is an essential raw material for the production of the anti-viral compound acyclovir (an antiviral drug used chiefly in the treatment of herpes and AIDS) [18].

-1, 3-dioxolane is a powerful aprotic solvent for used in formulations, in production processes or even as a reactant itself. It is also an essential ingredient in important industrial polymers and certain niche pharmaceutical intermediates. Dioxolane can serve as a MV regulator in the polymerization of vinyl chloride. It can also serve to stabilize crosslinked PVC [19].

-Dioxolane is also used as an alternative for other more toxic organic solvents. For example, it is the best substitute for chlorinated organic solvents such as methylene chloride, 1,2-dichloroethane and 1,1,1-trichloroethane. Also it is the most powerful solvent for softening and dissolving polymers made from polar monomers, for e.g.- polycarbonates, acrylates, cellulosics urethanes, phenolics etc [20].

- A mixture of ethylene glycol and 1, 3-dioxolane (DOXL) forms an electrolyte and this electrolyte is used in lithium sulfur battery [21].

-2,2-dimethyl-1,3-dioxolane derivatives could serve as a promising compound for the development of novel anti-rhinoviral medicines. It works against HRV (human rhino-virus) protease [22].

-Glycerol acetals and Glycerol ketals can be synthesized through the acid-catalyzed reactions of glycerol with aldehydes and ketones respectively. And these are used as fuel (diesel) additives in biodiesel industry [23].

Classical methods for the synthesis of acetals involve the treatment of aldehydes or ketones with an alcohol by either protic or Lewis acid catalyst[7]. Unfortunately, these procedures have some disadvantages such as use of corrosive and costly reagents or additives, halogenated solvents, large waste and high catalyst loading[24-39].

In this work a novel and efficient metal-free protocol for the synthesis of acetals and cyclic acetals using green chemical procedures and green solvents has been discussed to obtain valuable information on reaction conversion, selectivity and reaction yield.

According to the green chemistry point of view reactions are important because these types of reactions would allow the minimization of waste compared to stepwise reactions the amount of solvents, reagents, adsorbents and energy would be dramatically decreased. Thus, these reactions would allow an ecologically and economically favorable production[40].

1.5. Materials and Methods-

[A]Chemicals

1. Ethylene glycol (Diol)
2. Methyl propyl Ketone
3. Hydrochloric acid
4. Solvents like- DMSO, DMF, Toluene, Distilled Water,
5. Solvent for TLC chamber- petroleum ether and benzene.
6. Iodine crystals

[B]Apparatus

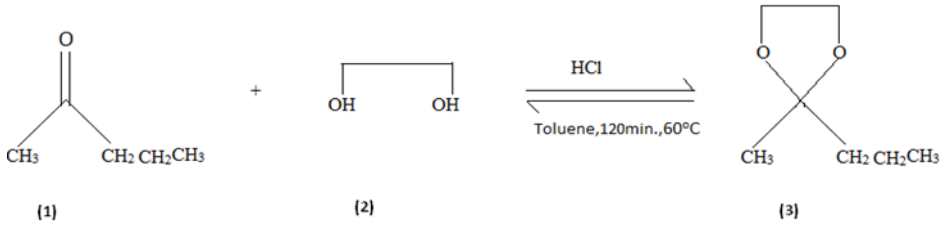
Water condenser, guard tube, glass wool, plastic pipes, stand to hold condenser, clamp, heating mantle, R. B. flask, dean-stark apparatus, cork, petroleum gel, TLC sheets, desicator, etc.

Methods-

[1] By **conventional heating** method-

General procedure for 2-methyl-2, propyl dioxolane

To a flame-dried 100ml flask add methyl propyl ketone **(1)** and ethylene glycol **(2)** in equimolar ratio. Add hydrochloric acid as a catalyst and then toluene as a solvent. Fix the reaction vessel using dean stark apparatus and condenser (**Fig.4**). As temperature rises, the reaction was monitored by TLC (**Fig.5**). After the completion of the reaction, the mixture was filtered and concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction was completed in 120min. with 70% yield **(scheme 1).**



Scheme- 1

Fig.4:- Reaction setup

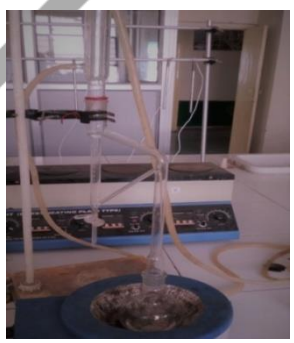


Fig.5:- Desicator showing TLC

Procedure using green solvents: [1] DMSO as a green solvent.To a flame-dried 100ml flask add reactant **(1)** and **(2)** in equimolar ratio. Add hydrochloric acid as a catalyst and then DMSO as a solvent. Set the reaction vessel using dean stark apparatus and condenser. As temperature rises, the reaction was monitored by TLC. After the completion of the reaction, the mixture was filtered and concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction was completed in 150min.with 60% yield.

[2] DMF as a green solvent:

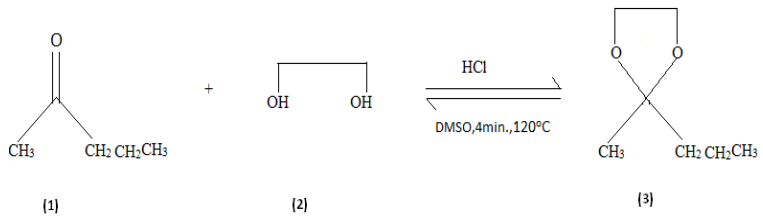
To a flame-dried 100ml flask add reactant **(1)** and **(2)** in equimolar ratio. Add hydrochloric acid as a catalyst and then DMF as a solvent. Fix the reaction vessel using dean stark apparatus and condenser. As temperature rises, the reaction was monitored by TLC. After the completion of the reaction, the mixture was filtered and concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction was completed in 133min. with 62% yield.

[3] Water as a universal green solvent:

To a flame-dried 100ml flask add reactant **(1)** and **(2)** in equimolar ratio. Add hydrochloric acid as a catalyst and then water as a solvent. Fix the reaction vessel using dean stark apparatus and condenser. As temperature rises, the reaction was monitored by TLC. After the completion of the reaction, the mixture was filtered and concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction was completed in 60min. with 80% yield.

[B] By **microwave heating** method-[1] Using DMSO

An equimolar ratio of reactant **(1)** and **(2)** in a neat, clean and flame dried reaction vessel. The mixture was irradiated with microwave at specified power level for several minutes and the progress of reaction was monitored by TLC. After completion of reaction, the product was concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction takes only 4min. with 78% yield (**scheme- 2**).



Scheme- 2

Microwave heating

[2] Using DMF as a solvent-

An equimolar ratio of reactant **(1)** and **(2)** in a neat, clean and flame dried reaction vessel. The mixture was irradiated with microwave at specified power level for several minutes and the progress of reaction was monitored by TLC. After completion of reaction, the product was concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction takes 5min. with 81% yield.

[3] Using Water as a solvent-

An equimolar ratio of reactant **(1)** and **(2)** in a neat, clean and flame dried reaction vessel. The mixture was irradiated with microwave at specified power level for several minutes and the progress of reaction was monitored by TLC. After completion of reaction, the product was concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction takes only 4min. and gives 87% yield.

[4] Solvent-free reaction-

An equimolar ratio of reactant **(1)** and **(2)** in a neat, clean and flame dried reaction vessel. The mixture was irradiated with microwave at specified power level for several minutes and the progress of reaction was monitored by TLC. After completion of reaction, the product was concentrated on sand bath to obtain pure product **(3)** 2-methyl-2, propyl dioxolane. The reaction takes 3min. and gives 88% yield.

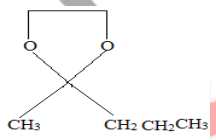
Table-1:- Preparation of 2-methyl-2, propyl dioxolane from ketone

Sr. no.	Reactant 1	Reactant 2	Solvents	Heating method	Time (min.)	Temp.(º C)	Yield (%)
1.	Methyl propyl ketone	Diol	Toluene	Conventional	120	60ºC	70%
2.	Methyl propyl ketone	Diol	DMSO	Conventional	150	60ºC	60%
3.	Methyl propyl ketone	Diol	DMF	Conventional	133	70ºC	62%
4.	Methyl propyl ketone	Diol	Water	Conventional	60	80ºC	85%
5.	Methyl propyl ketone	Diol	DMSO	Microwave	4	120ºC	78%
6.	Methyl propyl ketone	Diol	DMF	Microwave	5	110ºC	81%
7.	Methyl propyl ketone	Diol	Neat	Microwave	3	80ºC	87%
8.	Methyl propyl ketone	Diol	Water	Microwave	4	100ºC	88%

1.6. Result and discussion

[A] Result:

We obtain the product 2-methyl-2, propyl dioxolane **(3)**

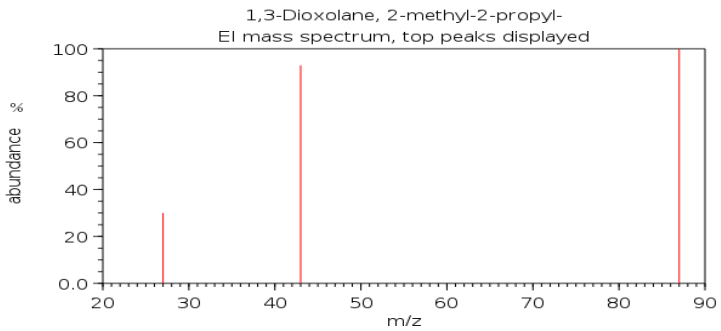


(3)

Colourless oil, B.P.136ºC.

Table-2: - EI mass spectrum

Total peaks	34
m/z top peak	87
m/z second highest peak	43
m/z third highest peak	27



B] Discussion:

Generally, dioxolanes are synthesized in presence of a p-toluene sulfonic acid which is extremely strong acidic. In many sulfonation reactions SO_2 are given off which may lead to bronchitis and conjunctivitis.

It is clear from the above mechanism that green solvent requires classically 1.5 – 2 hours and can be readily achieved under microwave irradiation in high yields in 3 – 5 minutes(**Table 1:** entry 5,6,7,8 can be chosen as representative examples). This might have been because of reactants are overheated by the conventional way of heating, and this may result in the decomposition of the reactants, reagent and/or products. But this is not the case with microwave heating as these radiations pass through the walls of reaction vessels. Microwave just heat up the sample and not the apparatus (reaction vessel) and therefore, energy consumption is much reduced.

Water appears to be a better option compared to other green solvents because of its abundant, non-toxic, non-corrosive and non-flammable nature. Recently, it has drawn much more attention, because water is cheap, safe and environmentally begins solvent.

Interestingly, the experimental procedure for methyl propyl dioxolane is remarkably simple and in absence of harmful solvents (such as TsOH) or inert atmosphere.

1.7.Conclusion

Green chemistry is definitely not another part of science; it is another philosophical approach that, through the introduction and expansion of its rules, could lead to a substantial development in chemistry laboratories.

Green chemistry has found alternative ways to cut energy consumption by changing processes. It also provides alternative solvents (**Table-3**) which reduces ecological problems because of its less toxicity, less hazard, safer than other organic solvents for industrial applications. In the coming decades, green chemical synthesis will be more attractive and practical. Researchers and pharmaceutical companies need to be encouraged to consider the principles of green chemistry while designing and choosing reagents.

Table-3: - Red solvents and their alternative green solvents

Sr. no.	Red Solvents	Alternative solvents	Other green solvents
1.	Benzene	Cyclohexane	Water, Glycerol, PEG
2.	CCl_4, $CHCl_3$	Dichloromethane(DMC)	
3.	Toluene, acetone and Xylene	Ethyl acetate, ethyl lactate	

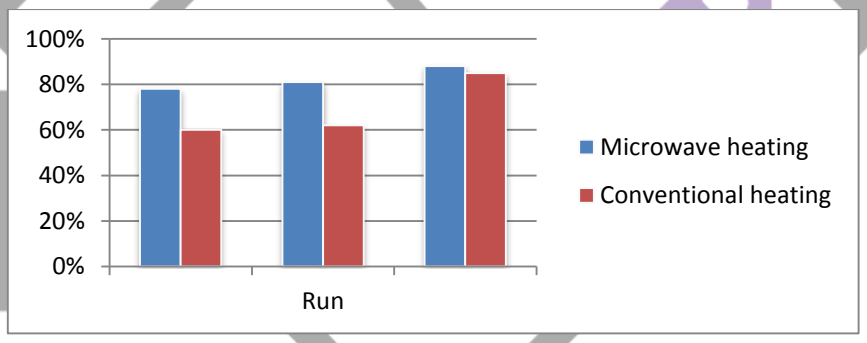


Fig.7:- - Chart indicating effect of microwave heating and conventional heating method of 2-methyl-2, propyl dioxolane. Conventional heating method takes a lot of time while microwave heating is not.

Acknowledgement-We thank JVWU, jaipur for providing me research environment and facilities that greatly improved the manuscript.

References

[1] Louis D .Quin and John A. Tyrell, "Fundamentals of Hetero Cyclic Chemistry",9th Ed., Wiley , New York , 2010.
[2] Paula Yurkanis Bruice ,"Organic Chemistry " 6th Ed., United.State , pp- 34, 2011.
[3] M. Issan Ahmed and Asniza Mustapha , Molecules , 15,P. pp-7498-7508, 2010.
[4] Pradnya R. Gadpayle , Sanjay P. Wate , Ashok P Mehere , KishorP. Bhusari and Nitin B. Charbe, Medicinal Chemistry & Drug Discovery , 3(1) ,P. pp-11-19 ,2012.
[5] A.A. Bogomazova, N.N. Mikhailova, and S.S. Zlotskii, Sovremennaya khimiya tsiklicheskikh atsetalei Poluchenie, reaktsii i svoistva (Modern Chemistry of Cyclic Acetals. Preparation, Reactions, Properties),Saarbrücken: LAPLAMBERT Academic Publishing GmbH&Co, 2011.
[6] Shavshukova, S.Yu., S.V. Shvetsov and S.S. Zlotskii, Sovremennye promyshlennye gerbitsidy. Poluchenie iprimenenie (Modern Industrial Herbicides. Preparation and Application), Ufa: OOO "Monografiya," 2011.
[7] Greene T. W. and Wuts P. G. M., Protecting Groups in Organic Synthesis, John Wiley and Sons, New York, 3rd edn, **1999**.

[8] (a) H. Fujioka, A. Goto, K. Otake, O. Kubo, Y. Sawamaz and T. Maegawa, Chem. Commun., 47, pp-9894, 2011. (b) J. W. Barlow, A. P. McHugh, O. Woods and J. Walsh, J., Eur. J. Med. Chem., 46, pp-1545, 2011. (c) T. M. Kubczyk, S. M. Williams, J. R Kean, T. E. Davies, S. H. Taylor and A. Graham, E., Green Chem., 13, pp-2320, 2011. (d) M. Tobisu, A. Kitajima, S. Yoshioka, I. Hyodo, M. Oshita and N. Chatani, J. Am. Chem. Soc., 129, pp-11431, 2007. (e) U. Schneider, H. T. Dao and S. Kobayashi ,Org. Lett., 12, pp-2488, 2010.
[9] (a) T. Ohta, T. Michibata, K.Yamada, R. Omori and I. Furukawa, Chem. Comm., 1192, 2003. (b) Y.J. Zhang, W. Dayoub, G.R. Chen and M. Lemaire, Green Chem., 13, pp-2737, 2011. (c) K. Motokura, H. Yoneda, A. Miyaji and T. Baba, Green Chem., 12, pp-1373, 2010. (d) A. Iwata, H. Tang and A. Kunai, J. Org. Chem., 67, pp-5170, 2002.
[10] (a) M. Curini, F. Epifano, M. C. Marcotullio and O. Rosati, Synlett, 777, 1999. (b) W. Panchan, S. Chiampanichayakul, D. L. Snyder, S. Yodbuntung, M. Pohmakotr, V. Reutrakul, T. Jaipetch, and C. Kuhakarn, Tetrahedron, 66, pp-2732, 2010. (c) T. Maegawa, K. Otake, A. Goto and H. Fujioka, Org. Biomol. Chem., 9, pp-5648, 2011.
[11] T. Xu, Q. Yang. Ye W., Q. Jiang and Z. Xu, J. Chen, Z. Yu, Chem. Eur. J., 17, pp-10547, 2011.
[12] (a) P. H. R. Silva., V. L. C. Goncolves and C. J. A. Mota, Bioresour. Technol., 101, 6225, 2010. (b) H. Maarse , Volatile Compounds in Foods and Beverages, Marcel Dekker Inc, New York, 1991.
[13] https://www.thoughtco.com .
[14] www.ochempal.org.
[15] https://profiles.uonbi.ac.ke (sch.504.protecting groups in organic synthesis.pdf).
[16] https://en.m.wikipedia.org. –Protecting groups.
[17] https://profiles.uonbi.ac.ke
[18] www.intermediates.basf.com- 1,3-Dioxolane-BASF intermediates.]
[19] www.intermediates.basf.com- 1,3-Dioxolane-BASF intermediates.
[20] Paul T. Anastas and David G. Hammond (2016), "Ch-4 Case Studies Green Chemistry in Practice".
[21] Duck-Rye Chang, Suck-Hyun Lee, Sun-Wook Kim and Hee-Tak Kim, "Binary electrolyte based on ethylene glycol and 1,3-Dioxolane for lithium sulfur battery," Journal of power Sources, vol. 112., Issue 2, 2002.
[22] Qiyan Zhang,et al., "Design, Synthesis & Evaluation of 2,2-dimethyl-1,3-dioxolane derivatives as human rhinovirus 3C protease inhibitors." Bioorganic & Medicinal Chemistry Letters., vol. 27., Issue 17, 2017.
[23] Ancuta Roxana Trifoi and Paul Serban Agachi., "Glycerol acetals and ketals as possible diesel additives: A review of their synthesis protocols," Renewable and Sustainable Energy Reviews., vol. 62, 2016.
[24] M. S. Newman and M. Renoll , J.Am.Chem.Soc, 67, pp-1621-1621, 1945.
[25] Andrzej Piasecki, "Alkoxyalkyl-substituted glycerol acetals: New hydrophobic intermediates forsurfactant synthesis", Journal of the American Oil Chemists' Society 1992.
[26] M. David, G. Collard Adolphus and Jones Robert M. Kriegel, "Synthesis and Spectroscopic Analysis of a Cyclic Acetal: A Dehydration Performed in Aqueous Solution", J. Chem. Educ., pp-178-170, 2001.
[27] Bimal K. Banik and Marin Chapa, Jocabed Marquez and Magda Cardona, "A remarkable iodine-catalyzed protection of carbonyl compounds", Tetrahedron Letters, vol 46, 2005.
[28] S.J. Yang, X.X. Du, L. He and J.T. Sun, "synthesis of acetals and ketals catalysed by tunstosilicic acid supported on active compound", 2005.
[29] Gyula Lukacs, Marta Porcs-Makkay, Anna Komaro and Gyula Simig , "Microwave assisted synthesis of benzophenone and acetophenone ethylene ketals", ARKIVOC (iii), pp-17-24, 2008. www.arkat-usa.org.
[30] V. B Vol'eva., I. S. Belostotskaya and others , "New approach to the synthesis of 1,3-dioxolanes", Russian Journal of Organic Chemistry., vol. 48, 2012.
[31] Cox and Sussanah Dawn, "Synthesis and Resolution of a Substituted Dioxolane from Glycerol", Undergraduate Honors Thesis Collection. 213, 2014.
[32] Marcio Jose da Silva, Martheus Oliveira Guimaraes and Armmanda Aparecida Julio., "A highly regioselective and Solvent Free Sn(II)-catalysed Glycerol Ketals Synthesis at room temperature", Vol.145, issue 3, Catalysis Letters, 2015.
[33] A. Denis, Bulanov and Irina A. Novokshonova, "highly efficient microwave assisted synthesis of polyfunctional 1,3-dioxolanes from γ-hydroxypropynals" .Tetrahedron Lett., 57.
[34] Qiyan Zhang, et.al., "Design, Synthesis and Evaluation of 2,2-dimmethyl-1,3-dioxolane derivatives as human rhinovirus 3C protease inhibitors". Bioorganic and Medicinal Chemistry Letters, 27, 2017.
[35] Yi Hong, Niu Linbin, Wang Shengchun, Liu Tianyi, Atul K. Singh and Aiwen Lei, "Visible-Light-Induced Acetalization of Aldehydes with Alcohols" *Org.* Lett., 19, pp-122-125, 2017.
[36] Q.Zhou, T.Jia, X. X. Li, L. Zhou, C.J. Li and Y.S. Feng, "Photoorganocatalytic Synthesis of Acetals from Aldehydes," Synth.commun., 48, pp-1068, 2018.
[37] Taoufik Rohand, Jerome savary, Istvan E.Marko, "Synthesis of dioxolanes and oxazolidines by silica gel catalysis" 2018.
[38] ref- Amin Talebian-Kikalaieh, Aishah Saidina, Neda Najaafi,Sara Tarighi, "A review on the catalytic acetalisation of bio-renevable glycerol to fuel additives" 2013.
[39] D. T. Belmont and L. A. Paquette, JOC, 50, pp-4102, 1985.
[40] Synthesis of cyclic acetals and esters, Chapter 5, p153-210, https://shodhganga.inflibnet.ac.in/bitstream/10603/22036/9/09_chapter_5.pdf

International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)
ISSN(P): 2249–6890; ISSN(E): 2249–8001
Vol. 10, Issue 1, Feb 2020, 783-788

GENERALIZATION OF NUMERICAL INTEGRATION

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ABSTRACT

This present paper discusses only first order integral to find the area. For first order integration, different methods of numerical integration are derived from Newton's cotes formula using different values of "n". As the values of "n" increases then the formulas discuss higher order differential which lead to more accurately representation of more complex functions. There are five common numerical integration formula for n=1, 2, 3, 4 and 6 namely Trapezoidal, Simpson's one-third, Simpson's three by eight, Boole's and Weddle's method. In this paper we derived the formulas for n=5, n=7 to get more accurate value of integration.

KEYWORDS: Numerical Integration, First Order Integral & Newton Quadrature Formula

Received: Jan 08, 2020; **Accepted**: Jan 28, 2020; **Published**: Oct 09, 2020; **Paper Id.**: IJMPERDFEB202067

Original Article

INTRODUCTION

Definite integral is an indispensable part of mathematics and modern science and technology. From ancient Greek time it is applied to find the area of lands of irregular shapes. Now a days it is applied to find the area of ocean floor, forest cover area, volume of water reserved in a ice caps etc. In such situation the function which represented the shape of the object is very complex or is impossible to represent them in accurate mathematical function the rule of numerical integration becomes very importance. Instead of using the function to integrate, numerical integration used the value of function on equal intervals to integrate it The path to the growth of the integral is a branching one, where comparable discoveries were made concurrently by different people. The history of the method is at present known as integration began with attempts to find the area beneath curves. The fundamentals for the finding of the integral were first laid by Cavalieri, an Italian Mathematician, in around 1635. Cavalier's work centered on the examination that a curve can be measured to be sketched by a moving point and an area to be sketched by a moving line. .In order to contract with the geometrical concept of a moving point, Cavalieri worked with what he called "indivisibles". That is, if a moving point can be measured to sketch a curve, then Cavalieri viewed the curve as the sum of its points. By this concept, every curve is made up of an infinite number of points, or "indivisibles". Similarly, the "indivisibles" that collected an area were an infinite number of lines.

However Cavalieri was not the first person to think geometric figures in terms of the infinitesimal. Kepler had done so before him, he was the first to use such a concept in the calculation of areas (Hooper 248-250) .Cavalieri now took a step of great importance to the formation of the integral calculus. He utilized his notion of "indivisibles" to imagine that there were an infinite number of shaded regions. He saw that as the individual shaded regions became small enough to simply be lines, the jagged steps would gradually define a line. As the jagged steps became a line, the shaded region would form a triangle. As the number of shaded regions increases, the ratio remains simply one-half.

Cavalier's methodology agreed with the long-held result that the area of a triangle was one-half the product of the base and height. He had also shown that his notion of "indivisibles" can be used to successfully describe the area underneath the curve. That is, as the areas of the rectangles turn into lines, their sum does indeed produce the area underneath the curve. Cavalieri went on to use his method of "indivisibles" to find the area underneath many different curves. However, he was never able to formulate his techniques into a logically consistent foundation that others accepted. Though Cavalier's techniques clearly worked, it was not until Sir John Wallis of England that the limit was formally introduced in 1656 and the foundation for the integral calculus was solidified (Hooper 249-253).John Wallis' contribution to the integral calculus was to derive an algebraic law for integration that alleviated the necessity of going through such analysis for each curve. Through examining the relationship between a function and the function that describes its area, he was able to derive an algebraic law for determining area-functions. Rather than simply present the algebraic relationship.

DERIVATION OF NEWTON QUADRATURE FORMULA

Let I = $\int_a^b f(x)dx$

Where f(x) takes the values y_0, y_1, y_2…….y_n for x = x_0, x_1, x_2,……,x_n.

Let us divide the interval (a, b) into n- sub intervals of width h = $\frac{b-a}{n}$ so that

X_0 = a, $x_1 = x_0 + h$, $x_2 = x_0 + 2h$, …….. $Xn = x_0 + nh = b$.

Taking a new variate r such that

r = $\frac{x-x_0}{h}$

x = $x_0 + rh$, dx = hdr

Then I = $\int_x^{x_0+nh} f(x)dx = h\int_0^n f(x_0 + rh)\,dr$

Using Newton's forward interpolation formula, we have

$$I = h\int_0^n [y_0 + r\Delta y_0 + \frac{r(r-1)}{2!}\Delta^2 y_0 + \frac{r(r-1)(r-2)}{3!}\Delta^3 y_0 + \frac{r(r-1)(r-2)(r-3)}{4!}\Delta^4 y_0 + \frac{r(r-1)(r-2)(r-3)(r-4)}{5!}\Delta^5 y_0 + \ldots\ldots\ldots\ldots + \frac{r(r-1)(r-2)\ldots\ldots(r-n+1)}{n!}\Delta^n y_0]\,dr$$

I = Integrating term by term, we obtain

$$I = h\int_0^n y_0 dr + h\int_0^n r\Delta y_0 dr + h\int_0^n \frac{r(r-1)}{2!}\Delta^2 y_0\,dr + h\int_0^n \frac{r(r-1)(r-2)}{3!}\Delta^3 y_0\,dr + h\int_0^n \frac{r(r-1)(r-2)(r-3)}{4!}\Delta^4 y_0\,dr + h\int_0^n \frac{r(r-1)(r-2)(r-3)(r-4)}{5!}\Delta^5 y_0\,dr + \ldots\ldots\ldots\ldots$$

$$\int_x^{x_0+nh} f(x)dx = h\,[ny_0 + \frac{n^2}{2}\Delta y_0 + (\frac{n^3}{3} - \frac{n^2}{2})\frac{\Delta^2 y_0}{2!} + (\frac{n^4}{4} - n^3 + n^2)\frac{\Delta^3 y_0}{3!} + (\frac{n^5}{5} - \frac{3n^4}{2} + \frac{11n^3}{3} - 3n^2)\frac{\Delta^4 y_0}{4!} + (\frac{n^6}{6} - 2n^5 + \frac{35n^4}{4} - \frac{50n^3}{3} + 12n^2)\frac{\Delta^5 y_0}{5!} + \ldots\ldots\ldots\ldots\ldots\ldots$$

Which is the general quadrature formula and is known as Newton's- Cotes quadrature formula. Now we shall derive some important quadrature formulae by taking n = 5 and 7.

DERIVING QUADRATURE FORMULA FOR n=5.

By Newton's cotes quadrature formula, we have

$\int_{x_0}^{x_0+nh} f(x)dx =$ h [$ny_0 + \frac{n^2}{2}\Delta y_0 + (\frac{n^3}{3} - \frac{n^2}{2})\frac{\Delta^2 y_0}{2!} + (\frac{n^4}{4} - n^3 + n^2)\frac{\Delta^3 y_0}{3!} + (\frac{n^5}{5} - \frac{3n^4}{2} + \frac{11n^3}{3} - 3n^2)\frac{\Delta^4 y_0}{4!} + (\frac{n^6}{6} - 2n^5 + \frac{35n^4}{4} - \frac{50n^3}{3} + 12n^2)\frac{\Delta^5 y_0}{5!} + (\frac{n^7}{7} - \frac{15n^6}{6} + 17n^5 - \frac{225n^4}{4} + \frac{274n^3}{3} - 60n^2)\frac{\Delta^6 y_0}{6!} + (\frac{n^8}{8} - 3n^7 + \frac{175n^6}{6} - 147n^5 + 406n^4 - 588n^3 + 360n^2)\frac{\Delta^7 y_0}{7!} +$ ……]

When n = 5 means f(x) can be approximated by a polynomial of 5th order so that 6th and higher order differences are vanishes in the general quadrature formula.

$\int_{x_0}^{x_0+5h} f(x)dx$ = h [$5y_0 + \frac{25}{2}\Delta y_0 + \frac{175}{12}\Delta^2 y_0 + \frac{75}{8}\Delta^3 y_0 + \frac{425}{144}\Delta^4 y_0 + \frac{95}{288}\Delta^5 y_0$]

= 5h [$y_0 + \frac{5}{2}\Delta y_0 + \frac{35}{12}\Delta^2 y_0 + \frac{15}{8}\Delta^3 y_0 + \frac{85}{144}\Delta^4 y_0 + \frac{19}{288}\Delta^5 y_0$]

=5h [$y_0 + \frac{5}{2}(y_1-y_0) + \frac{35}{12}(y_2-2y_1+y_0) + \frac{15}{8}(y_3-3y_2+3y_1-y_0) + \frac{85}{144}(y_4-4y_3+6y_2-4y_1+y_0) + \frac{19}{288}(y_5-5y_4+10y_3-10y_2+5y_1-y_0)$]

= $\frac{5h}{288}$(19y_0 + 75y_1 + 50y_2 + 50y_3 + 75y_4 + 19y_5)

Clearly above equation determines the area of five strips bounded by the ordinates at x_0, x_0 +h, x_0 + 2h, x_0 + 3h, x_0 + 4h, x_0 + 5h at a time. Similarly, using the formula we find

$\int_{x_0+(n-5)h}^{x_0+nh} f(x)dx = \frac{5h}{288}$(19$y_{n-5}$ + 75y_{n-4} + 50y_{n-3} + 50y_{n-2} + 75y_{n-1} +19y_n)

Adding all the above results, we get

$\int_{x}^{x_0+h} f(x)dx = \int_{x_0+h}^{x_0+5h} f(x)dx + \int_{x_0+5h}^{x_0+10h} f(x)dx + \ldots\ldots\ldots + \int_{x_0+(n-5)h}^{x_0+nh} f(x)dx$

= $\frac{5h}{288}$\{19[(y_0 + y_n) + 2(y_5 + y_{10} + y_{15} + …….. + y_{n-5})] + 75(y_1 + y_4 + y_6 + y_9+ y_{11} + y_{14} + ……+ y_{n-4} + y_{n-1}) + 50(y_2 + y_3 + y_7 + y_8 + y_{12} + y_{13} +……+ y_{n-3} + y_{n-2})

This is required general formula for n = 5

DERIVING THE GENERAL FORMULA FOR n= 7

By Newton's cotes quadrature formula, we have

$\int_{x_0}^{x_0+nh} f(x)dx =$ h [$ny_0 + \frac{n^2}{2}\Delta y_0 + (\frac{n^3}{3} - \frac{n^2}{2})\frac{\Delta^2 y_0}{2!} + (\frac{n^4}{4} - n^3 + n^2)\frac{\Delta^3 y_0}{3!} + (\frac{n^5}{5} - \frac{3n^4}{2} + \frac{11n^3}{3} - 3n^2)\frac{\Delta^4 y_0}{4!} + (\frac{n^6}{6} - 2n^5 + \frac{35n^4}{4} - \frac{50n^3}{3} + 12n^2)\frac{\Delta^5 y_0}{5!} + (\frac{n^7}{7} - \frac{15n^6}{6} + 17n^5 - \frac{225n^4}{4} + \frac{274n^3}{3} - 60n^2)\frac{\Delta^6 y_0}{6!} + (\frac{n^8}{8} - 3n^7 + \frac{175n^6}{6} - 147n^5 + 406n^4 - 588n^3 + 360n^2)\frac{\Delta^7 y_0}{7!} +$ ……])

When n = 7 means f(x) can be approximated by a polynomial of 7th order so that 8th and higher order differences are vanishes in the general quadrature formula.

$\int_{x_0}^{x_0+7h} f(x)dx =$ 7h [$y_0 + \frac{7}{2}\Delta y_0 + \frac{77}{12}\Delta^2 y_0 + \frac{175}{24}\Delta^3 y_0 + \frac{3731}{720}\Delta^4 y_0 + \frac{357}{160}\Delta^5 y_0 + \frac{4417}{8640}\Delta^6 y_0 + \frac{751}{17280}\Delta^7 y_0$]

= 7h [$y_0 + \frac{7}{2}(y_1-y_0) + \frac{77}{12}(y_2-2y_1+y_0) + \frac{175}{24}(y_3-3y_2+3y_1-y_0) + \frac{3731}{720}(y_4-4y_3+6y_2-4y_1+y_0) + \frac{357}{160}(y_5-5y_4+10y_3-10y_2+5y_1-y_0) + \frac{4417}{8640}(y_6-6y_5+15y_4-20y_3+15y_2-6y_1+y_0) + \frac{751}{17280}(y_7-7y_6+12y_5-35y_4+35y_3-21y_2+7y_1-y_0)$]

$$\int_{x_0}^{x_0+7h} f(x)dx = \frac{7h}{17280}(751y_0 + 3577y_1 + 1323y_2 + 2989y_3 + 2989y_4 + 1323y_5 + 3577\ y_6 + 751y_7)$$

Clearly above equation determines the area of five strips bounded by the ordinates at x_0, x_0 +h, x_0 + 2h, x_0 + 3h, x_0 + 4h, x_0 + 5h, x_0 + 6h and x_0 + 7h at a time. Similarly, using the formula we find

$$\int_{x_0+7h}^{x_0+14h} f(x)dx = \frac{7h}{17280}(751y_7 + 3577y_8 + 1323y_9 + 2989y_{10} + 2989y_{11} + 1323y_{12} + 3577\ y_{13} + 751\ y_{14})$$

$$\int_{x_0+(n-7)h}^{x_0+nh} f(x)dx = \frac{7h}{17280}(751y_{n-7} + 3577y_{n-6} + 1323y_{n-5} + 2989y_{n-4} + 2989y_{n-3} + 1323y_{n-2} + 3577\ y_{n-1} + 751\ y_n)$$

Adding all the above results, we get

$$\int_{x_0}^{x_0+h} f(x)dx = \int_{x_0+h}^{x_0+7h} f(x)dx + \int_{x_0+7h}^{x_0+14h} f(x)dx + \ldots\ldots\ldots + \int_{x_0+(n-7)h}^{x_0+nh} f(x)dx$$

$$\int_{x_0}^{x_0+nh} f(x)dx = \frac{7h}{17280}\{\ 751[(y_0 + y_n) + 2(\ y_7 + y_{14} + y_{21} + \ldots\ldots\ldots + y_{n-7})] + 3577(y_1 + y_6 + y_8 + y_{13} + y_{15} + y_{20}\ \ldots\ldots\ldots + y_{n-6} + y_{n-1}\ ) + 1323(y_2 + y_5 + y_9 + y_{12} + y_{16} + y_{19}\ \ldots\ldots\ldots + y_{n-5} + y_{n-2}) + 2989(y_3 + y_4 + y_{10} + y_{11} + y_{17} + y_{18} \ldots\ldots\ldots + y_{n-4} + y_{n-3})\ .$$

This is the required general formula for n = 7.

REFERENCES

1. *Andrew Paul, "Numerical Integration", California State University Northridge, p.2*
2. *Christoph W. Ueberhuber, "Numerical Computation 1: Methods, Software, and Analysis", Springer Science & Business Media, 27-Feb-1997 - Mathematics - 474 pages.*
3. *Md.Amanat Ullah, "Numerical Integration and a Proposed Rule", American Journal of Engineering Research (AJER) e-ISSN: 2320-0847 p-ISSN: 2320-0936, 4(2015), Issue-9, 120-123*
4. *http://mathworld.wolfram.com/NumericalIntegration.html*
5. *(http://www.csun.edu/~ajp42955/Math382Paper.html*
6. *R. Feistel, "Numerical implementation and oceanographic application of the Gibbs thermodynamic potential of seawater", SRef-ID: 1812-0792/os/2005-1-9.*
7. *Balázs Somodi and Lóránt Földváry, "Application of numerical integration techniques for orbit determination of state-of-the-art LEO satellites", 55/2 (2011) 99–106, doi: 10.3311/pp.ci.2011-2.02.*
8. *Ossendrijver, Mathieu (Jan 29, 2016). "Ancient Babylonian astronomers calculated Jupiter's position from the area under a time-velocity graph". Science. **351**: 482–484. Doi :10.1126/science.aad8085. PMID 26823423.*
9. *https://web.stanford.edu/group/sisl/k12/optimization/MO-unit4-pdfs/4.2simpsonintegrals.pdf*
10. *http://www.austms.org.acu/modules/exponential.pdf*
11. *https://courses.lumenlearning.com/boundless-algebra/chapter/applications-of-exponential-and-logarithm-functions/*
12. *ERIK TALVILA AND MATTHEW WIERSMA, "SIMPLE DERIVATION OF BASIC QUADRATURE FORMULAS", arXiv: 1202.0249v1 [math.CA] 1 Feb 2012.*
13. *RAJESH KUMAR SINHA, "NUMERICAL METHOD FOR EVALUATING THE INTEGRABLE FUNCTION ON A FINITE INTERVAL", International Journal of Engineering Science and Technology, Vol. 2(6), (2010), 2200-2206.*
14. *Md.Amanat Ullah, "Numerical Integration and a Proposed Rule", American Journal of Engineering Research (AJER) e-*

ISSN: 2320-0847 p-ISSN: 2320-0936, Volume-4(2015), Issue-9, pp-120-123,

15. *Li J., "The Trapezoidal Rule for Computing Cauchy Principal Value*
16. *Integral on Circle, Hindawi Publishing Corporation, Volume 2015, Article ID 918083, 9 pages.*
17. *A.K. SINGH and G. R. THORPE, "SIMPSON'S 1/3-RULE OF INTEGRATION FOR UNEQUAL DIVISIONS OF INTEGRATION DOMAIN".*
18. *Matthew Harker and Paul O'Leary, "Trapezoidal rule and its error analysis for the Grünwald-Letnikov operator", Int. J. Dynam. Control (2017) 5:18–29, DOI 10.1007/s40435-016-0236-z.*
19. *M.A. Olshanskii and D. Safin, "Numerical integration over implicitly defined domains for higher order unfitted finite element methods" , Numerical Analysis and Scientific Computing Preprint Seria , (2015)*
20. *Javed M. and Trefethen L.N, A trapezoidal rule error bound unifying the Euler–Maclaurin formula and geometric convergence for periodic functions, (2014) Proc. R.*
21. *Soc. A 470: 20130571. http://dx.doi.org/10.1098/rspa.2013.0571.*
22. *Zhao W. et al, "COMPOSITE TRAPEZOID RULE FOR THE RIEMANN-STIELTJES INTEGRAL AND ITS RICHARDSON EXTRAPOLATION FORMULA" , Italian journal of pure and applied mathematics , N. 35(2015) ,311-318*

Journal of The Gujarat Research Society

ISSN: 0374-8588
Volume 21 Issue 16, December 2019

Pharmacological Evaluation and Comparison studies of Ethanolic extracts of Leaves of *Aegle Marmelos* and *Trigonella Foenum Graecum* with standard Drug Glibenclamide on Alloxan-Induced Diabetic Mice

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Abstract: In the present study, Ethanolic extracts of Leaves of *Aegle marmelos* and Seeds of *Trigonella foenum graecum* were evaluated for thier antihyperglycemic, antihyperlipidemic, and antioxidant effects against normal and alloxan (AXN)-induced diabetic mice. Type II diabetes was induced in Swiss Albino Mice by administration of a single intraperitoneal (IP) injection of AXN at a dose of 150 mg/kg. Effects of three different doses of these extracts (100, 200, and 300 mg/kg/day, I.P.) and Glibenclamide (5 mg/kg/day,) administered for 28 days were studied on parameters such as blood glucose, lipid profile.. Results were analyzed using Student's't' Test. No significant changes were noticed in blood glucose, serum lipid levels, and kidney parameters in normal mice treated with plant extracts. The efficacy of both plants extract as an antihyperglycemic, antihyperlipidemic, and antioxidant agent in AXN-induced diabetes was comparable to that of the standard drug , 5 mg/kg of *Glibenclamide*. Present findings provides substantial comparision that Plants extracts has significant antihyperglycemic, antihyperlipidemic, and antioxidative effects in diabetic experimental mice. Hence, these extracts i.e. Seeds of *Trigonella foenum graecum* and *Aegle Marmelos* may be regarded as a promising natural and safe remedy for the prevention or delay of diabetic complications.

Keywords: *Keywords: antioxidants, Aegle Marmelos, Alloxan, Trigonella foenum graecum, blood glucose, diabetes.*

Introduction

Diabetes mellitus has been recognized as one of the emerging health problems worldwide because of its high prevalence, adverse clinical outcomes, marked reduction in the quality of life of patients and high healthcare costs[1-3]. It is characterized by abnormalities in carbohydrate, lipid and lipoprotein metabolism. A study in Indian patients has shown that the average annual expenditure of one patient is approximately 4,500 rupees. So, the estimated annual cost of diabetic treatment and diabetes related care in India would be approximately 180,000 million rupees [4]. From different surveys, it has been found that there is a high financial impact on society from the cost of diabetic care and treatment. From last several decades Allopathic, anti-

diabetic drugs had been predominantly used for curing diabetes mellitus. It includes sulfonylureas like Tolbutamide, Tolazamide, Acetohexamide, Chlorpromide, Glyburide, Glipizide, Glimepride etc. Continuous usage of following drugs can attribute to creating some adverse effects associated with these drugs except biguanides are hypoglycemia and raise in weight. They also cause liver and kidney mal-function. Gastrointestinal mal functions, pain in abdomin, distention and anemia are associated with acarbose therapy [5-6]. Ethno-botanical knowledge has played a particularly important role in historical diabetes therapies, with over 1200 species of medicinal plants recognized throughout the world for their ability to treat diabetic indications [7] . Natural products have emerged as sources of endless opportunities for new drug discovery [8,9].The selected plants for this study are easily available and very extensively used in traditional medicinal systems by the local peoples in the treatment of diabetes mellitus. In the present study, leaves of Aegle marmelos, and seeds of Trigonella foenum graecum in ethanolic extracts were used to investigate their effect on blood glucose, lipid profile, serum creatinine, blood urea SGOT, and SGPT in mice model of Alloxan (AXN) induced diabetes mellitus. A comparison was made with the Glibenclamide, a standard drug used in treatment of diabetes mellitus [10]. Glibenclamide is a sulphonyl urea drug which stimulates insulin secretion through the beta cell sulphonylurea receptor, and possibly through a direct effect on intracellular calcium transport. It specifically improves the abnormal first phase insulin release in type II diabetes, and also has an effect on the second phase. It is extensively metabolised, and renal clearance accounts for only 4% of total drug clearance[11-12].

Animals and grouping

Healthy Swiss albino mice, weighing 25-35g were procured from the animal house of Indian Veterinary Research Institute, Bareilly, UP. They were caged under standard laboratory condition in our animal house at J.V.W. University, Jaipur and were utilized for the study and conducting experiments. Experimental protocols were approved from the Institutional Animal Ethical Committee and were conducted according to committee for the purpose of control and supervision of experiments on animals (CPCSEA) guidelines, India[13]. The mice were randomly distributed to different groups with six animals in each. Animals were provided with standard pellets and drinking water ad libitum and were maintained at 12 h light and dark cycle[14].

Drugs and chemicals

Raw and crisp leaves of *Aegle marmelos* were collected from Herbal Garden, J.V. Women's University, Jaipur (Rajasthan). The seeds of *Trigonella foenum graecum* (Trigonella foenum-graecum L.) were procured from Jobener Research Centre, Rajasthan. Based on Taxonomical features the specimen samples were identified and registered at Herbarium in Department of Botany, Rajasthan University, Jaipur. *Aegel Marmalos* was registered as RUBL- 211737 and for *Trigonella Foenum-graecum* it was RUBL – 211738. AXN was obtained Sigma Aldrich Co, Mumbai, India. Glibenclamide was obtained from SD fine chemicals pvt ltd.. All biochemical parameters such as cholesterol, triglyceride, total cholesterol, cholesterol–HDL, serum creatinine, SGPT, and SGOT kits were purchased from ERBA diagnostic Mannheim Gmbh Ltd.

Induction of diabetes

Diabetes was induced in overnight fasted mice by the intraperitoneal (IP) injection of AXN dissolved in freshly prepared citrate buffer (0.1 M, pH 4.5) in a volume of 1 ml/kg body weight at a dose of 150 mg/kg body weight [15]. Diabetes was confirmed 72 h after the injection by determining the blood glucose concentration. Only those animals with blood glucose level of >250 mg/dl used for the experiment. The

diabetic animals were allowed free access to tap water and pelleted diet and were maintained at room temperature in plastic cages.

Acute toxicity studies[16]

. A dosage of 1000 mg / kg body weight of all interperitoneally administered *Aegle Marmelos* extracts was considered to be non-toxic. For the ethanol extract of *Trigonella foenum graecum* seeds in mice, I.P. administrated acute toxicity (LD50) were studied. LD50 of I.P. was about 2000 mg / kg.

Biochemical estimations[17-20]

Blood glucose estimation was done using a glucometer and with Trinder's enzymatic method using an autoanalyzer. Lipid profile was checked with an autoanalyzer using the following methods: Cholesterol oxidase-phenol + aminophenazone (CHOD-PAP) end point method was used for cholesterol estimation, phosphotungstic acid end point method for high density lipoprotein (HDL) estimation, and glycerol-3-phosphate oxidase (GPO)-Trinder end point method was used for triglyceride estimation. Very low density lipoprotein (VLDL) and low density lipoprotein (LDL) fractions were calculated by using Friedewald's equation as follows:

Physiological profile of kidneys was estimated by Jaffe's method Initial Rate for creatinine and modified Trinder's method, end point for urea, using autoanalyzer.

Statistical analysis[21]

Results are expressed as mean ± standard error of mean (SEM) and statistical difference was evaluated using Student's't' test. Data were considered statistically significant at a $P < 0.05$ All the above statistical analyses were done on SPSS software.

Preliminary Phytochemical Analysis[22-29]

For determination of numerous bioactive components in leaves extract and seed extract of Aegle marmelos and Trigonella foenum graecum respectively these were screened to various phyto-chemical tests. The Various phytochemical tests determine qualitatively constituents were performed to develop the profiles of given extract for its chemical composition. Phytochemical tests were performed for both plant extracts were screened to show the presence of various phyto-constituents like alkaloids, tannins, glycosides, steroids, carbohydrate, saponins, phenolic compound, and flavonoids.as shown in Table 1.

Test	Ethanolic Extract of Aegle Marmelos	Ethanol Extract of Trigonella foenum graecum
Alkaloides	+	+
Carbohydrates	+	+
Glycosides	+	+
Flavanoides	+	+
Poly Phenols	+	+
Saponins	+	+
Steroids	-	+
Terpenoids	+	+
+ Presence of Constituents	- Absence of Constituents	

Effect of Plant Extracts on blood glucose levels

AXN treatment produced significant increase in blood glucose levels (268.67± 6.07 mg/dl) with respect to the control group (111.68± 1.6 mg/dl). Alloxan administered intraperitoneal with dosage of 150 mg/kg body weight resulted in a highly significant increase in serum glucose levels of diabetic control animals (Gr-II). Similar increases in levels of serum glucose were traced after 72 hours of Alloxan injection in 70% Ethanoic extract of Plants (Gr-IV to IX) and in standard drug Glibenclamide (Gr-III), when compared with controlled group (Gr- I) as shown in Table 2.

Table 2. Effect of Ethanolic Extract of Both Plant on serum glucose levels

Group/ Treatment	Average serum glucose (mg/dl)				
	Day 0	Day 7	Day 14	Day 21	Day 28
Untreated Normal	111.68± 1.6	113.56± 0.99 (1.68)	114.19± 1.5 (2.24)	115.51± 0.77 (3.42)	116.49± 1.25 (4.3)
Untreated Diabetic	268.67± 6.07	270.05± 4.31 (0.51)	272.72± 3.11 (1.5)	275.09± 2.47 (2.38)	276.56± 2.74 (2.93)
Diabetic+ Glibenclamide	256.83± 1.44	226.47± 1.15 (-11.82)	201.14± 2.55 (-21.68)	151.32± 0.97 (-41.08)	144.32± 2.07 (-43.8)
Diabetic + AME100 mg/kg	254.64± 1.6	239.84± 3.11 (-5.81)	189.52± 2.07 (-25.57)	173.5± 2.47 (-31.86)	185.29± 2.54 (-27.23)
Diabetic + AME200 mg/kg	273.54± 0.99	241.28± 2.47 (-11.79)	210.98± 2.18 (-22.87)	165.61± 1.4 (-39.45)	179.67± 2.58 (-34.31)
Diabetic + AME300 mg/kg	255.76± 1.5	215.84± 2.74 (-15.6)	181.38± 3.99 (-29.08)	131.37± 0.87 (-48.63)	164.47± 1.74 (-35.69)
Diabetic + TFG 100 mg/kg	263.44± 0.54	232.09± 0 (-11.9)	195.88± 0 (-25.64)	182± 0.89(-30.91)	181.91± 0 (-30.94)
Diabetic + TFG 200 mg/kg	267.66± 0.65	225.59± 0 (-15.71)	183.13± 0 (-31.58)	142.15± 2.15 (-46.89)	147.2± 0 (-45)
Diabetic + TFG 300 mg/kg	260.02± 0.52	219.55± 0 (-15.56)	185.45± 0 (-28.67)	171.96± 0.84 (-33.86)	174.7± 0 (-32.81)

All values in tables are expressed as mean± S.E.M; * denotes statistically significantly mean, "P<0.05, (*)represents variation with initial values

Effect of Plant Extracts on Weight Response: Body Weight

The results of the body weight of mice's of diabetic control (Group II), Normal (Group I) and trial drug groups (Group III to XII) of both plant fractions were summarized in Table 3 below. From the results, it was observed that the body weight of all the mice of diabetic control group was reduced from its initial level (29.02 ± .41 gm) after the trial period of 4 weeks (18.25 ± .68 gm). Whereas, the alloxan induced diabetic mice were treated with standard drug glibenclamide (5 mg/k.g. b.w.) in group XIII and it has seen that the body weight of all the mice were improved from 28.81 ± 0.25 gm to 29.74 ± 0.29 gm in the first week. It was further increased within 28 days (34.98 ± 0.32 gm).

The present studies suggested that with both plant extract had a significant growth accelerating effect. After supplementation with both plants for 14 days, the body weight was notably regained. After 21 days of the supplementation, the animals started to gain their normal weight.

Table 3. Effect of Ethanolic Extract of Both Plant on Body weight

Group/ Treatment	Average Body Weight (g)				
	Day 0	Day 7	Day 14	Day 21	Day 28
Untreated Normal	27.65± 0.48	28.02± 0.5 (1.33)	28.37± 0.54 (2.6)	29.04± 0.51 (5.02)	29.92± 0.58 (8.2)
Untreated Diabetic	29.02± 0.41	27.27± 0.32 (-6.03)	24.4± 0.34 (-15.92)	21.55± 0.59 (-25.74)	18.24± 0.68 (-37.14)
Diabetic+ Glibenclamide	28.81± 0.25	29.57± 0.29 (2.63)	31.15± 0.34 (8.12)	33.66± 0.38 (16.83)	34.31± 0.32 (19.09)

Diabetic+AME100 mg/kg	28.99± 0.35	26.56± 0.26 (-8.38)	28.69± 0.31 (-1.03)	30.18± 0.24 (4.1)	31.29± 0.31 (7.93)
Diabetic + AME200 mg/kg	28.25± 0.35	26.46± 0.37 (-6.33)	28.39± 0.3 (0.49)	30.93± 0.24 (9.48)	32.21± 0.12 (14.01)
Diabetic + AME300 mg/kg	28.22± 0.49	26.06± 0.45 (-7.65)	27.82± 0.39 (-1.41)	31.12± 0.17 (10.27)	32.24± 0.36 (14.24)
Diabetic + TFG 100 mg/kg	28.1± 0.54	25.91± 0.74 (-7.79)	26.63± 0.66 (-5.23)	29.33± 0.77 (4.37)	32.03± 0.74 (13.98)
Diabetic + TFG 200 mg/kg	27.94± 0.65	26.39± 0.56 (-5.54)	26.68± 0.28 (-4.5)	30.12± 0.4 (7.8)	32.28± 0.61 (15.53)
Diabetic + TFG 300 mg/kg	27.87± 0.52	26.74± 0.4 (-4.05)	27.89± 0.39 (0.07)	31.77± 0.63 (13.99)	33.65± 0.6 (20.73)

All values in tables are expressed as mean± S.E.M; * denotes statistically significantly mean, "P<0.05, (*)represents variation with initial values

Effect of Plant Extracts on the lipid profile

AXN produced significant increases in serum cholesterol (184.47± 2.48 vs. 115.83± 3.09 mg/dl in normal control mice), LDL (145.28± 1.72 vs. 98.95± 1.51 mg/dl in normal control mice), and VLDL (32.94± 0.09 vs. 27.44± 0.39 mg/dl in normal control mice), as well as marked reduction in serum HDL levels (18.65± 0.77 vs. 30.05± 0.38 mg/dl in normal control mice). As shown in Table 3, treatment with both plant extracts at different dose levels reduced the levels of serum cholesterol, triglycerides, VLDL, and LDL which was comparable to the levels in control group . Glibenclamide at a dose of 5 mg/kg also produced the same effect . Increase in HDL levels was also much pronounced in animals treated with extracts or 5 mg/kg of Glibenclamide which was comparable to the normal control animals.

Table 3. Effect of Plant Extracts on lipid profile

Group/Treatment	**Lipid profile parameters**			
	Total Cholesterol	**HDL-C**	**LDL-C**	**VLDL-C**
Untreated Normal	115.83± 3.09	30.05± 0.38	98.95± 1.51	27.44± 0.39
Untreated diabetic	184.47± 2.48	18.65± 0.77	145.28± 1.72	32.94± 0.09
Diabetic+ Glibenclamide	114± 0.85 (-28.41)	28.49± 0.4 (5.34)	106.97± 0.69 (-8.19)	26.99± 0.12 (-12.65)
Diabetic + AME100 mg/kg	115.83± 3.09 (-4.71)	29.06± 0.35(2.84)	102.2± 1.21 (-12.62)	26.58± 0.14 (-26.79)
Diabetic + AME200 mg/kg	184.47± 2.48(22.22)	30.65± 0.57 (11.8)	92.99± 0.24 (-17.55)	26.64± 0.09 (-22.91)
Diabetic + AME300 mg/kg	115.83± 3.09 (-4.71)	30.48± 0.36 (8.17)	103.43± 2.46 (-7.31)	19.44± 0.18 (-33.9)
Diabetic + TFG 100 mg/kg	154.8± 0.65 (-7.89)	30.73± 0.34 (10.03)	102.14± 1.08 (-6.96)	19.22± 0.03 (-35.22)
Diabetic + TFG 200 mg/kg	137.94± 0.7 (-17.47)	29.78± 0.68 (3.95)	103.31± 1.01 (-5.92)	17.99± 0.39 (-38.9)
Diabetic + TFG 300 mg/kg	140.63± 0.28(-14.95)	30.67± 0.84 (17.01)	89.89± 1.26 (-14.24)	14.94± 0.21 (-49.95)

All values in tables are expressed as mean± S.E.M; * denotes statistically significantly mean, "P<0.05, (*)represents variation with initial values HDL: High density lipoprotein; VLDL :Very low; density lipoprotein; LDL :Low density lipoprotein

Effect of Plant Extracts on kidney and liver parameters

AXN-diabetic (DC) mice exhibited higher serum creatinine (1.59± 0.03mg/dl) and blood urea(41.83± 0.45 mg/dl) levels as compared to those of normal control mice (0.65 ± 0.01 and 22.02 ±0.16 mg/dl, respectively) [Table 4], Chronic treatment with Plant Extracts with all the different doses significantly reduced the elevated creatinine as well as blood urea levels in diabetic mice(0.84± .01, 0.8± .01,0.75± .01, 0.82± 0,0.78± 0,0.77± 0) and (22.71± 0.07,22.25± 0.15,21.72± 0.09,19.45± 0.09,20.49± 0.37,20.49± 0.15 respectively), which was comparable to the levels in Glibenclamide (5 mg/kg) treated animals (0.8± 0.01and 21.35± 0.11 mg/dl, respectively).

Serum glutamic oxaloacetic transaminase (SGOT) level was significantly reduced in mice treated with 740 mg/kg of Plant Extracts (28.46± 0.11,28.72± 0.06,22.1± 0.02,38.01± 0.72,36.32± 0.77,42.82± 0.85U/l) or 5 mg/kg of Glibenclamide (21.99± 0.28U/l) when compared to diabetic control mice (44.42± 0.41U/l). Similarly, Serum glutamic pyruvic transaminase (SGPT) level was significantly reduced in mice treated with Plant Extracts or 5 mg/kg of Glibenclamide (34.63± 1.16,33.16± 0.28,32.99± 0.28,47.86± 0.7,45.09± 0.66,44.98± 0.21,U/l and 31.29± 0.35 U/l, respectively), when compared to diabetic control mice (68.65± 0.63 U/l). This indicates that Plant Extracts also improved the liver physiology and may have hepatoprotective effects [Table 4].

Table 4. Effect of Plant Extracts on serum creatinine and blood urea levels

Group/Treatment	Liver and kidney parameters (mg/dl)			
	SGOT	SGPT	Creatinine	Blood Urea
Untreated Normal	24.1± 0.49	32.86± 1	0.65± 0.01	22.02± 0.16
Untreated diabetic	44.42± 0.41	68.65± 0.63	1.59± 0.03	41.83± 0.45
Diabetic+ Glibenclamide	21.99± 0.28 (-46.31)	31.29± 0.35 (-49.03)	0.8± 0.01 (-38.86)	21.35± 0.11 (-25.43)
Diabetic + AME100 mg/kg	28.46± 0.11 (-39.79)	34.63± 1.16 (-52.22)	0.84± .01 (-41.6)	22.71± 0.07 (-4.03)
Diabetic + AME200 mg/kg	28.72± 0.06 (-40.25)	33.16± 0.28 (-56.85)	0.8± .01 (-42.77)	22.25± 0.15 (-5.41)
Diabetic + AME300 mg/kg	22.1± 0.02 (-52.49)	32.99± 0.28 (-57.03)	0.75± .01 (-47.09)	21.72± 0.09 (-8.34)
Diabetic + TFG 100 mg/kg	38.01± 0.72 (-26.07)	47.86± 0.7 (-26.9)	0.82± 0 (-44.06)	19.45± 0.09 (-20.31)
Diabetic + TFG 200 mg/kg	36.32± 0.77 (-28.94)	45.09± 0.66 (-31.63)	0.78± 0 (-46.22)	20.49± 0.37 (-14.75)
Diabetic + TFG 300 mg/kg	42.82± 0.85 (-16.33)	44.98± 0.21 (-30.67)	0.77± 0 (-45.51)	20.49± 0.15 (-13.82)

All values in tables are expressed as mean± S.E.M; * denotes statistically significantly mean, "P<0.05,

Discussion

DM is one of the most common chronic diseases, and is associated with hyperlipidemia and co-morbidities such as obesity and hypertension. Hyperlipidemia is a metabolic complication of both clinical and experimental diabetes. AXN, a p-cytotoxin, induces “chemical diabetes” in a wide variety of animal species, including mice, by selectively damaging the insulin-secreting p-cells of the pancreas[30]. IP injection of AXN produces fragmentation of DNA of the p-cells of pancreas, which stimulates poly (ADP-ribose) and depletes nicotinamide adenine dinucleotide (NAD) ultimately leading to the destruction of p-cells. It is evidenced by the clinical symptoms of hyperglycemia and hypoinsulinemia[31]. The serum glucose, lipid, and cholesterol values for the mice are in agreement with those expected for AXN-diabetic mice.

Decrease in blood glucose levels was found to be more effective with leaves extract of Aegle Marmelos in doses of 300 and Seeds extract of Fenugreek 200 mg/kg. Glibenclamide treatment also showed rapid normalization of blood glucose due to its insulin releasing effects. The plant extracts may involve one or more compounds which decrease the blood glucose levels, suggesting that the natural constituents could act synergistically to induce a hypoglycemic effect as described by other researchers[32-35] . These effects might be achieved by facilitating insulin release from pancreatic p-cells, inhibiting glucose absorption in the gut, stimulating glycogenesis in the liver, and/or increasing glucose utilization by the body. These compounds also exhibited antioxidant and hypolipidemic activities, restored the enzymatic functions, and helped in repair and regeneration of pancreatic islets and the alleviation of liver and renal damage[36-37].

Insulin deficiency may be responsible for dyslipidemia because insulin has an inhibitory action on 3-hydroxy-3-methyl-gluta-ryl-CoA (HMG-CoA) reductase, a key enzyme that is rate limiting in the metabolism of cholesterol-rich LDL particles. The development of hypertriglyceridemia in uncontrolled diabetes in humans (possibly in insulin-deficient AXN-diabetic mice) may be due to a number of metabolic abnormalities that occur sequentially[38]. Acute insulin deficiency initially causes an increase in free fatty acid mobilization from the adipose tissue, resulting in increased secretion of VLDL and triglycerides from the liver. In diabetic mice, there is a decrease in lipoprotein lipase activity, resulting in impaired clearance of VLDL and chylomicrons from the plasma[39].

Administration of Plant Extracts decreased the levels of tissue free fatty acids and phospholipids. Accumulation of triglycerides is one of the risk factors in coronary heart disease (CHD)[40]. The significant increase in the level of triglycerides in the liver and kidney of diabetic control mice may be due to the lack of insulin. Under normal conditions, insulin activates the enzyme lipoprotein lipase and hydrolyzes triglycerides. Plant Extracts reduces triglycerides in the tissues of AXN-induced diabetic mice and may prevent the progression of CHD.

In diabetes, SGOT and SGPT activities are increased, which may be due to the cellular damage. The plant extract was observed to normalize the levels of these enzymes, which indicates that it has a promising antidiabetic effect without inducing toxicity.

Administration of Plant Extracts and Glibenclamide reduced the lipid peroxidative markers in the liver and kidney tissues of diabetic mice. This indicates that both plants extract inhibits oxidative damage due to the antiperoxidative effect of thier ingredients. This could be correlated with previous studies reporting that *Aegle Marmelos* and *Trigonella foenum-graecum*,have antiperoxidative and antihyperlipidemic effects in diabetic animals[41-46].

The antidiabetic and anti hyperlipidemic effects of Plant Extracts may be due to the effect of active constituents of different plants, viz., trigonelline and scopoletin from T. *foenum-graecum' and* Aegeline from *Aegle Marmelos ,* which may be responsible for scavenging the free radicals liberated by AXN in diabetic mice[47-50].

On the basis of the aforementioned results, it may be concluded that Plant Extracts has significant antihyperglycemic, antihyperlipidemic, and antioxidative effects in diabetic experimental mice. Hence, Plant Extracts may be regarded as a promising natural and safe remedy for the prevention or delay of diabetic complications.Further it was also concluded that by comparing the data obtained from study that dose level of 200mg/kg of ethanoic extract of seeds of T. *foenum-graecum'* ws in par with 300 mg.kg of ethanolic extract of Aegel marmelos Leaves.

References :

1. WHO. World Health Organization. Global report on diabetes; 2016
2. Sonny C, Young E. State of diabetes care in Nigeria: A review state of diabetes care in Nigeria: A review. Nigerian Health Journal. 2011;11:101-106
3. Guariguata L., Whiting D.R., Hambleton I., Beagley J., Linnenkamp U., Shaw J. E., (2013), Global estimates of diabetes prevalence for 2013 and projections for 2035 for the IDF Diabetes Atlas, Diabetes

Res Clin Pract, 49.

4. Chang CL, Lin Y, Bartolome AP, Chen YC, Chiu SC, Yang WC. Herbal therapies for type 2 diabetes mellitus: Chemistry, biology, and potential application of selected plants and compounds. Evid Based Complement Altemat Med 2013;2013:1-33.
5. Bnouham M, Ziyyat A, Mekhfi H, Tahri A, Legssyer A. Medicinal plants with potential antidiabetic activity-a review often years of herbal medicine research (1990-2000). Int J Diabetes Metab 2006;14:1-25.
6. Trivedi NA, Mazumdar B, Bhatt JD, Hemavathi KG. Effect of shilajit on blood glucose and lipid profile in alloxan-induced diabetic rats. Indian J Pharmacol 2004;36:373-6.
7. Chakravarty BK, Gupta S, Gambhir SS, Gode KD. Pancreatic p-cell regeneration. A novel antidiabetic mechanism of Pterocarpus marsupium Roxb. Indian J Pharmacol 1980;12:123-7.
8. Siddique O, Sun Y, Lin JC, Chien YW. Facilitated transdermal transport of insulin. J Pharm Sci 1987;76:341.
9. Ewart RB, Komfeld S, Kipnis DM. Effect of lectins on hormone release from isolated rat islets of langerhans. Diabetes 1975;24:705-14.
10. Abubakari AR, Bhopal RS. Systematic review on the prevalence of diabetes, overweight/ obesity and physical inactivity in Ghanaians and Nigerians. Public Health. 2008;122:173-182
11. Ahmad, M., Ismail, N., Ismail, Z. Pharmacognistic profile of Trigonella seed and its hypoglycaemic activity. Natural Product Sciences 1995, 1, 25–30.
12. Ajabnoor, M.A., Tilmisany, A.K. Effect of Trigonella foenum-graecum on blood glucose levels in normal and alloxan diabetic mice. J. Ethnopharmacol. 1988, 22, 45–49.
13. American Diabetes Association (2017): Standards of medical care in diabetes—2017. Abridged for primary care providers. Clin Diab. 35 (1): 5-26.
14. Appian Subramoniam Plants with Anti-Diabetes Mellitus Properties 1st Edition, CRC Press 2016, ISBN 9781482249897
15. Cetto AA, Weidenfeld H, Revilla MC, Sergio LA. Hypoglycemic effect of Equisetum mriochaetum aerial parts on STZ diabetic rats. J Ethnopharmacol 2000;72:129-33.
16. OECD Guideline for testing of Chemicals- Acute Oral Toxicity - Acute Toxic Class Method-423. Adopted: 17th December 2001.
17. Trinder P. Determination of blood glucose using an oxidase-peroxidase system with anon-carcinogenic chromogen. J Clin Pathol 1969,22:158-61.
18. Siedel J, Hagele EO, Ziegenhom J, Wahlefeld AW. Reagent for the enzymatic determination of serum total cholesterol with improved lipolytic efficiency. Clin Chem 1983;29:1075-80.
19. Assmann G, Schriewer H, Schmitz G, Hagele EO. Quantification of high-density-lipoprotein cholesterol by precipitation with phosphotungstic Acid/MgCI2. Clin Chem 1983;29:2026-30.
20. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. Clin Chem 1972;18:499-502.
21. Cholongitas E, Marelli L, Kerry A, Senzolo M, Goodier DW, Nair D, et al. Different methods of creatinine measurement significantly affect MELD scores. Liver Transpl 2007;13:523-9.

22. Ellman GL. Tissue sulfhydral groups. Arch Biochem Biophys 1959;82:70-7.
23. Kono Y. Generation of superoxide radical during autoxidation of hydroxylamine and an assay for superoxide dismutase. Arch Biochem Biophys 1978;186:189-95.
24. Luck H. Catalase In: Bergmeyer HU, editor. Methods of enzyme analysis. New York: Academic Press; 1971. p. 885-93.
25. Wills ED. Mechanism of lipid peroxide formation in animal's tissue. Biochem J 1996;99:667-76.
26. Bierman EL, Amaral JA, Balknap BH. Hyperlipidemia and diabetes mellitus. Diabetes 1975;25:509-15.
27. Rodrigues B, McNeill JH. Cardiac function in spontaneously hypertensive diabetic rats. Am J Physiol 1986;251:H571-80.
28. Tabatabaei-Malazy O, Larijani B, Abdollahi M. A systematic review of in vitro studies conducted on effect of herbal products on secretion of insulin from langerhans islets. J Pharm Pharm Sci 2012;15:447-66.
29. Sharma RD, Sarkhar A, Hazra DK, Misra B, Singh JB, Maheshwari BB. Toxicological evaluation of Fenugreek seeds: A Long Term Feeding Experiment in Diabetic Patients. Phytother Res 1996;10:519-20.
30. Saxena A, Vikram NK. Role of selected Indian plants in management of type 2 diabetes: A review. J Altem Complement Med 2004;10:369-78.
31. Grover JK, Yadev S, Vats V. Medicinal plants of India with antidiabetic potential. J Ethnopharmacol 2002;81:81-100.
32. Mukherjee PK, Maiti K, Mukherjee K, Houghton PJ. Leads from Indian medicinal plants with hypoglycemic potentials. J Ethnopharmacol 2006;106:1-28.
33. Nikkila EA, Huttunen JK, Ehnholm C. Postheparin plasma lipoprotein lipase and hepatic lipase in diabetes mellitus. Relationship to plasma triglyceride metabolism. Diabetes 1977;26:11-21.
34. Bagdade JD, Porte D Jr, Bierman EL. Acute insulin withdrawal and the regulation of plasma triglyceride removal in diabetic subjects. Diabetes 1968;17:127-32.
35. Xue WL, Li XS, Zhang J, Liu YH, Wang ZL, Zhang RJ. Effect of Trigonella foenum-graecum (fenugreek) extract on blood glucose, blood lipid and hemorheological properties in streptozotocin-induced diabetic rats. Asia Pac J Clin Nutr 2007;16 Suppl 1:422-6.
36. Sabu MC, Kuttan R. Anti-diabetic activity of medicinal plants and its relationship with their antioxidant property. J Ethnopharmacol 2002;81:155-60.
37. Dhanabal SP, Kokate CK, Ramanathan M, Kumar EP, Suresh B. Hypoglycaemic activity of Pterocarpus marsupium Roxb. Phytother Res 2006;20:4-8.
38. Patel D, Prasad S, Kumar R, Hemalathaet S. An overview on antidiabetic medicinal plants having insulin mimetic property. Asian Pac J Trop Biomed 2012;2:320-30.
39. Chawla R, Thakur P, Chowdhry A, Jaiswal S, Sharma A, Goel R, et al. Evidence based herbal drug standardization approach in coping with challenges of holistic management of diabetes: A dreadful lifestyle disorder of 21st century. J Diabetes Metab Disord 2013; 12:35.
40. Subash-Babu P, Ignacimuthu S. Antihyperlipidemic and antioxidant effect of hyponidd in the brain of

streptozotocin induced diabetic rat. Int J Biol Chem 2007;1:196-204.

41. Ponnachan PTC, Paulose CS, Panikar KR: Effect of the leaf extract of Aegle marmelos (L.) Corr. In diabetic rats. Indian J. Exp. Bio.1993; 31:345–347.
42. Hema C.G and Lalithakumari K: Screening of Pharmacological actions of Aegle marmelos. Indian J. Pharmac. 1999;20: Page No.80-85.
43. Zia, T., Hasnain, S.N., Hasan, S.K. Evaluation of the oral hypoglycemic effect of T. foenumgraecum L. (Methi) in normal mice. J. Ethnopharmacol. 2001, 75, 191–195.
44. Chaturvedi, V., Pant, M.C. Effect of feeding fenugreek leaves (Trigonella foenum-graecum) on faecal excretion of total lipids and sterols in the normal albino rabbits. Curr. Sci. 1988, 57, 81–82.
45. Ismail M, Yaheya M: Clinical evaluation of antidiabetic activity of Trigonella seeds and Aegle marmelos leaves. World Applied Sciences Journal 2009; 7(10): 1231-1234 J Clin Biochem Nutr. 41(1): 1–11
46. Singh U and Kochhar A: Effect of supplementation of Bael (L.) and nutrition counseling on blood glucose, lipid profile and blood pressure of Non Insulin Dependent Diabetes. International journal of green and herbal chemistry 2012; 1(3): p 294-295.
47. Sankhla A, Sharma S. and Sharma N: Hypoglycemmic effect of Bael Patra (Aegle Marmelos) in NIDDM Patients, J Dairying Food H.S 2009; V 28: p 233-236
48. Therasa SV, Sivaraj A, Elumalai EK, Kumar CS, Thirumalai T, David E: Aegle marmelos leaf extract inhibit uptake of glucose across rat everted gut sacs in vitro. Pharmacologyonline 2009;2: 687-691
49. Ravikumar, P., Anuradha, C.V. Effect of fenugreek seeds on blood lipid peroxidation and antioxidants in diabetic rats. Phytother. Res. 1999, 13, 197–201.
50. Bin-Hafeez, B., Haque, R., Parvez, S., Pandey, S., Sayeed, I., Raisuddin, S. Immuno-modulatory effects of fenugreek (Trigonella foenum-graecum L.) extract in mice. Int. Immunopharmacol. 2003, 3, 257–265.

|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 4, Issue 5; May: 2020; Page No. 36-38

CONSTRAINT INDUCED MOVEMENT THERAPY FOR MOTOR RECOVERY IN CHRONIC STROKE PATIENT IN RURAL INDIA

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Article Info: Received 10 April 2020; Accepted 14 May 2020
DOI: https://doi.org/10.32553/ijmbs.v4i5.1115
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Conflict of interest: No conflict of interest.

Abstract
A possible explanation for the substantial remaining motor deficits in stroke patients might be the occurrence of learned nonuse, a phenomenon first described by Taub. Stroke patients who initially attempt to use the affected extremity find themselves unable to do so because the process of spontaneous recovery of function has not yet proceeded sufficiently far. This results in the experience of failure or punishment for attempts to move the extremity and in positive reinforcement for compensatory movements by the unaffected extremity-a learning process that might be supported by the teaching of compensatory activity during rehabilitation.
Keywords: CIMT, Motor recovery, Stroke patients

Introduction

16.9 million people worldwide have a first stroke every year, resulting in about 33 million stroke survivors and 5.9 million stroke-related deaths,1 making stroke the second most common cause of death and one of the main causes of acquired adult disability.[1,2] Around 80% of these survivors have motor impairments of the upper limb[3] that gravely affect their ability to perform activities of daily living and their social participation. The severity of upper limb paresis is an independent determinant of the outcome of basic activities of daily living after stroke.[4]

Origin of CIMT:

Original CIMT, although seen as the gold standard, has been investigated in only one RCT28-30 that included patients who had had a stroke more than 3 months previous to enrolment in the trial (Supplementary Web Appendix). After CIMT, significant positive medium to large effect sizes were reported for arm-hand activities, self-reported amount of arm-hand use in daily life, and selfreported quality of arm-hand movement in daily life.

Stroke is the leading cause of disability in the adult population and is frequently accompanied by substantial loss of motor function. Although acute and post-acute rehabilitation programs are available to stroke patients, substantial impairment and disability may persist for years. In a long-term follow-up study of stroke: it was found that 56% of the patients tested 5 years after stroke still had pronounced hemiparesis, which was the most common complaint at that time. The literature on the efficacy of rehabilitation programs targeting motor dysfunction (for a comprehensive review, see Duncan4) suggests that few effective methods are available and that their effects on chronic motor disability after stroke may be especially weak and not permanent.[5]

Current Perspectives of Signature CIMT and the Evolutionof mCIMT

Constraint-induced movement therapy (CIMT) is a widely explored treatment protocol to increase functional use of the more impaired upper extremity (UE) for persons with hemiparetic stroke. The theoretical basis for CIMT was developed through early research in nonhuman primates from which the concept of learned nonuse following limb somatosensory deafferentation emerged.[6,7]

Signature CIMT, developed by Taub and later used in the excite trial, included restraint of the less impaired upper extremity by donning a protective safety mitt for 90% of waking hours over a two-week intervention period. Subjects were also required to participate in six hours/day (five days/week) of ATP and RTP.[8,9]

Despite significant variability in protocols, each form of treatment delivery claims the name “modified” CIMT.[10,11]The issue therein is the lack of standardization by which to establish a consistent reference point for monitoring treatment dosage, creating confusion among the researcher, therapist and reimbursement communities. Therefore, an analysis of existing modified CIMT protocols, to devise a reasonable synthesis of approaches called “alternative” CIMT, should be performed and becomes a necessary precursor before a best model alternative intervention that incorporates key elements, such as intensity, duration, and subject chronicity.[12]

Methods

Subjects:

Four patients (3 women, 1 man) participated in the study. Their ages ranged from 45 to 65 years, with a median age of 52 years. Time after stroke varied from 3 to 15 years, with a median time after stroke of 6 years).Immediately poststroke, each patient participated in 6 to 8 weeks of rehabilitation; subsequently, they received conventional physical therapy once or twice a week for varying amounts of time.

The following exclusion criteria were used:

1. Stroke experienced less than 1 year earlier.
2. Serious sensory, cognitive, or aphasic deficits (Mini-Mental Test scores ranged from 26 to 30; Token Test14 scores, from -2 to 2) or severely depressed mood (CES-D Scale scores ranged from 6 to 22).
3. Lesion in the primary sensory or motor areas of the cortex.
4. Inability to extend at least 10" at the metacarpophalangeal and interphalangeal joints and 20" at the wrist.
5. Ability to make extensive use of the involved upper extremity (Motor Activity Log score above 2.5) so that significant further improvement could not be expected.
6. left-arm dominance, and
7. Age more than 80 years

Assessment

The Actual Amount of Use Test (AAUT) was developed by Taub as an implicit measure of actual use of an upper extremity. The test contains 21 items (eg, filling out a form). All patients signed informed consent for videotaping before the assessment phase but were not aware that they were being videotaped while performing AAUT activities.

The Arm Motor Ability Test (AMAT)[13] assesses the motor ability of the hand and arm during ADL tasks. The test consists of 13 complex tasks that include one to three components each, with a total of 28 component tasks. Sample items are eating with a spoon, drinking from a cup, putting on a sweater, and buttoning it.

Procedure:

The initial evaluation included the psychological and neurologic examination. Before and after the 2-week interventionperiod, as well as 3 months after treatment, the structured interview (MAL) and the laboratory motor tests (WMFT and AMAT) were administered. The AAUT was given only before and immediately after treatment.

Data Analysis:

For all the variables in the study Friedman one-way analysis of variance (ANOVA) was used to determine the overall change from pretreatment to posttreatment and to follow-up.

Results

Efficacy of the Intervention:

Almost doubled (increase of 98%) and quality of movement increased by 124% in the pretreatment to posttreatment comparison (both Wilcoxon tests: Z = -2.02, p = .020; table 2). The MAL showed a 166% increase in quality of movement of the affected extremity at posttreatment and 165% at follow-up (Friedman test: x2 = 6, p = .049; individual subject pretreatment to posttreatment and pretreatment to follow-up comparisons, all p values < .OS). A similarly strong improvement occurred on theamount of use scale of the MAL: it showed an improvement of 136% at posttreatment and 122% at the follow-up assessment. Amount of use MAL data were available for only three subjects.

Table 1: Pretreatment, Post-treatment, and Follow-Up Means, Standard Deviations, and Effect Sizes for All Patients

	Pretreatment		Posttreatment		Follow-Up		Effect Sizes Mean	
	Mean	SD	Mean	SD	Mean	SD	Pre-Post	Pre-Fol
AAUT AOU	0.62	0.36	1.23	0.38			1.63	
QOM	0.92	0.57	2.06	1.57			1.05	
MAL AOU	1.95	0.50	3.97	0.28	3.99	0.31	9.55	7.58
QOM	1.30	0.37	3.47	0.66	3.52	1.09	3.21	1.98
AMAT Time	11.39	4.40	9.21	3.40	9.35	3.34	0.62	0.60
FA	2.95	0.73	3.52	0.70	3.71	1.04	0.54	0.58
QOM	2.75	0.71	3.41	0.71	3.48	1.04	0.91	0.60
WMFT Time	13.12	6.69	7.60	4.42	12.10	7.08	1.23	0.25
FA	3.36	0.60	3.90	0.61	3.73	0.82	0.90	0.64
QOM	3.16	0.54	3.67	0.60	3.47	0.81	0.84	0.27

AAUT, Actual Amount of Use Test; AOU, amount of use; QOM, quality of movement; MAL, Motor Activity Log; AMAT, Arm Motor Ability Test; FA, functional ability; WMFT, Wolf Motor Function Test

Comparison of Effect Sizes

The ESs in all the CI therapy reports combined, including this one. Show that it is an effective method for the treatment ofupper extremity dysfunction in chronic stroke patients. The lowest but still positive ESs were obtained in the Wolf study, lO with ES ranging from 0.21 to 0.43

There is often a very large difference between what a stroke patient can do and what she or he does2i; CI therapy reduces this difference. As noted above,6,8 the disparity between the motor capacity of many stroke patients and their actual use of the limb may be due to learned nonuse that develops in the early poststroke period but which can be overcome by the application of an appropriate technique, such as CI therapy

Conclusion:

All the patients in this study were several years poststroke, and their condition had not improved for many months to years. Although some (nonsignificant) regression took place, the improvements were retained at the 3-month follow-up, suggesting that the therapy had produced a long-term treatment effect, as noted in previous research.* Taken together, the results from the previous studies and this experiment suggest that CI therapy is a powerful technique for the modification of motor deficit late after stroke for the substantial number of patients for whom it is applicable.

References:

1. Dennis MS, Bum JP, Sandercock PAG, Bamford JM, Wade DT, Warlow CP. Long-term survival after first-ever stroke: the Oxford Community Stroke Project. Stroke 1993;24:796-800.
2. Ferrucci L, Bandinelli S, Guralnik JM, Lamponi M, Bertini C, Falchini M, et al. Recovery of functional status after stroke: a post rehabilitation follow-up study. Stroke 1993;24:200-5.
3. Wilkinson PR, Wolfe CDA, Warburton FG, Rudd AG, Howard RS, Ross-Russell RW, et al. A long-term follow-up of stroke patients. Stroke 1997;28:507-12.
4. Duncan PW. Synthesis of intervention trials to improve motor recovery following stroke. Top Stroke Rehabil 1997;3: l-20. Wade DT, Collen FM, Robb GF, Warlow CP. Physiotherapy intervention late after stroke and mobility. BMJ 1992;304:609-13.
5. Taub E. Somatosensory deafferentation research with monkeys: implications for rehabilitation medicine. In: Ince LP. editor. Behavioral psychology in rehabilitation medicine: clinical'applications. New York: Williams &Wilkins; 1980. p. 371-401.
6. Russo SG. Hemiplegic upper extremity rehabilitation: a review of the forced-use paradigm. Neurol Rep 1995;19: 17-22. Taub E, Miller NE, Novack TA, Cook EW III, Fleming WC, Nepomuceno CS, et al. Technique to improve chronic motor deficit after stroke. Arch Phvs Med Rehabil 1993:74:347-54.
7. Taub E, Crago JE,-Uswatte G. Constr&t induced movement therapy: a new approach to treatment in physical rehabilitation. Rehabil Psvchol1998:43: 152-70.
8. Wolf SL, 'LeCraw DE, Barton LA, Jann BB. Forced use of hemiplegic upper extremities to reverse the effect of learned nonuse among chronic stroke and head-injured patients. ExpNeurol 1989;104:125-32.
9. Glass GV, McGraw B, Smith MC. Meta-analysis in social research. Beverly Hills (CA): Sage; 1981. Oldfield RC. The assessment and analysis of handedness: the Edinburgh Inventory. Neuropsychologia 1971;9:97-113.
10. Folstein MF, Folstein SE, McHugh PR. Mini-Mental Status Test. Weinheim, Germany: Beltz; 1990. Orgass B. Token test. Weinheim, Germany: Beltz; 1992.
11. Hautzinger M, Bailer M. AllgemeineDepressionskala. Weinheim, Germany: Beltz; 1993.
12. Kopp B, Kunkel A, Flor H, Platz T, Rose U, Mauritz K-H, et al. The Arm Motor Ability Test: reliability, validity, and sensitivity to change of an instrument for assessing disabilities in activities of daily living. Arch Phys Med Rehabil1997;78:615-20.
13. McCulloch K, Cook EW III, Fleming WC, Novack TA, Taub E. A reliable test of upper extremity ADL function [abstract]. Arch Phys Med Rehabil 1988;69:755.
14. Taub E, Pidikiti RD, DeLuca SC, Crago JE. Effects of motor restriction of an unimpaired upper extremity and training on improving functional tasks and altering brain behaviors. In: Toole JF, Good DC, editors. Imaging in neurologic rehabilitation. New York: Demos; 1996. p. 133-53.
15. Cohen J. Statistical power analysis for the behavioral sciences. New York: Academic Press; 1977.
16. Rosenthal R, Rubin DB. A simple general purpose display of magnitude of experimental effect. J Educ Psycho1 1982;74:166-9.
17. Andrews K, Stewart J. Stroke recovery: he can but does he? RheumatolRehabil 1979;18:43-8.

International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 21-11-2020; Accepted: 08-12-2020: Published: 19-12-2020
www.botanyjournals.com
Volume 5; Issue 6; 2020; Page No. 681-686

Bioremediation potential study of algae

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Abstract
The Dravyavati River (Amanishah Nala) as "the existing line of Jaipur" is the most contaminated channel in Jaipur. It additionally demonstrates its potential for self-filtration. Bioremediation is a contamination control innovation that utilizes natural frameworks to speed up the debasement or change of different dangerous organism to less destructive structures. Bioremediation is an acute and productive way for sterilization that has turned out to be progressively extended nowadays to close or weaken environmental contamination. The potential for green algae in wastewater remediation is anyway a lot more extensive in degree than its energy job. Water samples collected from Dravyavati River, Jaipur, India and identified algae through Microscopic method. The green algae assume a vital job in controlling and biomonitoring of genetic pollution in amphibian biological communities. Algae are critical bioremediation operators and areas of now being used in wastewater treatment.

Keywords: bioremediation, heavy metal, algae, wastewater treatment

Introduction
Bio-pointers can be characterized as a living being that gives quantitative data on the nature of the condition around it. Bio-indicator organism can be promoted to distinguish and evaluate the impacts of poisons on the earth (Pinto *et al*., 2003) [8]. Bio-indicators can say to us about the total amount of effects of various contaminations in the biological community and about to what extent an issue may endure (Mani and Kumar, 2014) [6]. Many algae are great directors of water quality, and numerous lakes are named on their overwhelming phytoplankton gathering (Brook, 1965) [1]. Primarily, many blue-green algae happen in poor supplement waters, while some develop well in naturally dirtied waters (Paswan and Kumar, 2014) [6]. Algae are most helpful as indicators in the context of eutrophication but have been employed as well to detect organic pollution because of their wee documented tolerance (Palmer, 1969) [5]. Their value as bio-accumulators of pesticides and heavy metals are limited (Volesky, 1990) [11].
Moreover, algae collected from treatment lakes are broadly utilized as nitrogen and phosphorus supplement for an agricultural reason and can be exposed to maturation to acquire strength from methane. Green algae are furthermore prepared to unite highly toxic substances, for example: selenium, zinc and arsenic in their cells and bodies appropriately destroy such elements from amphibian situations. Radiation is furthermore a necessary kind of infection as some water contains radioactive materials, and others get the chance to be radioactive through contamination many green algae can take up and accumulate various radioactive minerals in their cells even from an increasingly obvious attraction in the water (Mackenthun, 1969) [3].

Materials and Methods
Isolation of Pure Algae
Green algae media bring up to the arrangement or culture in which green algae develop. Every one of the media shares a few parts practically speaking: wellsprings of nitrogen (as nitrate, nitrite, and alkali), phosphorus, nutrients and follow metals (Phillips, 1977) [7]. Anyway the particular sorts of these supplements, their fixations and proportions fluctuate between the media (Sharma *et al*., 2011) [9]. To discover the best culture medium, societies used to various media of various synthetic organizations and pH, just like Juller's medium, Striking's basal medium, Chu-10 medium, N-8 medium, Kuhl's medium. Chu-10 medium proposed best for advancement, shading complex and morphology. Numerous researchers likewise revealed a comparative approach, for example, nourishing examinations with varieties in the measures of fundamental components in the arrangement may demonstrate that alterations of Chu No. 10 brought about a quick development rate of green growth. So it had brought about green algae in the Chu-10 medium. Chu's Medium No. 10 is used for culturing algae (Source of Chu's medium composition).

Table 1

Chu's Medium No. 10 M697 Composition	Fixings Milligrams/Liter
Calcium nitrate	40.000
Magnesium sulphate	25.000
Dipotassium phosphate	5.000
Sodium carbonate	20.000
Sodium silicate	25.000
Press Chloride	8.000

Out of various green algae distinguished and separated after. Five green algae were used during the present examination

Oscillatoria, Chlorella, *Nostoc*, *Navicula,* and *Anabaena*. All these are the closet from dirtied water of Amanishah Nala, which is being contaminated by mechanical consumers of Jaipur city in Rajasthan province of India. Water tests from Amanishah Nala were gathered and put away in disinfected glass bottles. Ahead to testing, these jugs were washed multiple times with source water to limit the danger of outer pollution. Irregular examples for the examination of phytoplankton were gathered nearby. Tests were transported in a case containing ice and were protected at 4°C. The glassware was rinsed. Before usage, these were flushed twice with faucet water and thrice with distilled water and were dry cleaned at 160 °C for 2 hours in a sight-seeing oven. Culture medium was sanitized at 15 lb weight (121°C) for 20 minutes in an autoclave. Ten ml of water test were immunized in 50 ml disinfected standard Chu 10 medium.

The stock and tribal societies of the test creatures were engendered in Chu-10 medium in a culture room kept up at 28°C. The way of life vessels were enlightened for 14 hours daily with cool white bright lights (9.8 Wm-2) light force at the outside of culture vessels). The culture was hand shaken something like twice every day to keep the life forms in a homogeneous state. Societies were exchanged to new media after every 8-10 days to keep them in an exponential period of development.

The culture was hatched till the presence of good development (28 days in Chu 10 medium) algal showing up in the improvement societies were analyzed minutely. Confinement and cleaning of algal strains were finished by rehashed sub-refined on cemented and in fluid media (Chu-10) by weakening and pour plate system. To dispense with eukaryotic debases, a little part of the test was included liquid culture medium and held under light (9.8 Wm-2) at 28°C in the culture space for many days. Parts of the examples were taken and sequentially (10, 100 times) weakened. At that point, 0.1 ml of weakened example was appropriately spread over the outside of media plates with the assistance of 'L' shaped glass bar. The plates were hatched in the way of the living room until the point that unmistakable states showed up. Singular provinces were gotten under binocular magnifying lens with the assistance of fine cylinders and suspended in new fluid supplement medium. Following 8-10 days of development, 0.1 ml tests were again plated on media plates and hatched in the culture room. Clear sound settlements were still gotten and vaccinated in the new fluid medium contained in the test tubes. This was rehashed until unialgal societies were built up.

Heavy Metal Analysis of Algae: Atomic digestion spectrometry is used to decide least identification breaking points of a scientific focus in an example. Reference gauges of a realized logical substance are required to build up the connection between the standard and the deliberate retention of the obscure.

The systematic procedure works by forcefully advancing an electron's orbital state to a higher vitality level for a brief timeframe (negligible nanoseconds). A characterized amount is essential for this advancement to happen, and the wavelength vitality of every component is explicit to a specific electron change. The procedure offers essential selectivity.

Since, every wavelength is related with just a single component, and the width of a retention line (on the request of a couple of picometers, is additionally standard for a specific part (Foster, 1976) [2]. The radiation transition barring an example and put together a case in the atomizer is estimated by using a finder. The Beer-Lambert Law is used to change over the proportion between the two qualities (the absorbance) to a logical focus. Three distinct destinations on the Dravyavati River were chosen for water test accumulation. Excellent condition, screw-topped high-thickness, pre-disinfected and legitimately marked One-liter polypropylene bottles were used for gathering. Therefore, they were dissected in the research center for following metals by Atomic Absorptio (digestion) Spectrometry (AAS) (Welz and Sperling, 2008) [12]. To survey all year water nature of the river, inspecting was done between 3 seasons: Summer, winter, and Rainy. Double refined water and high purity synthetic compounds were used for getting ready answers for analysis. Standard Methods proposed by the American Public Health Association (APHA) were used for conservation and examination of the water tests. They chose substantial metals Manganese and Zinc (Mn and Zn) were broken down. The recognition of following metals in the earth can be practiced by different strategies however in this examination, the AAS strategy – which is generally straightforward, adaptable, exact and free from impedance – was used. Substantial metals promptly frame buildings with natural constituents; along these lines, it is essential to crush such edifices by processing the example with solid acids. Processing smashes the natural issue, expels meddling particles and gets metallic mixes suspension to the arrangement. Also, the dominant algal species were manually collected with the help of forceps in an excess amount and brought to the laboratory. The samples were cleaned several times with tap water and finally with distilled water to remove the foreign material. Due to their abundance at the study site during the most of the season, they were further selected for testing the effect of the heavy metals toxicity. The chemical compound Zinc sulphate and Manganese sulphate was used as a source of heavy metal as these compounds are found in effluents of wastewater collected from Amanishah Nala to study the bioremediation potential of different algal genera against Zinc and Manganese.

Molecular Analysis: DNA sequencing played a decisive role and is an essential tool for many basic and connected research applications today. It has for instance given a vital device to decide a large number of nucleotide varieties related with specific hereditary illnesses. Although the algal species were identified on the morphological basis, the DNA sequence was carried out for the confirmation and molecular identification of algae as for bioremediation potential. Out of all microalgae samples collected from different Industrial sites of Amanishah Nala Jaipur, five algal genera were isolated, cultured, taxonomically identified and characterized. The sequencing of species acquired in this study affirmed the most significant characters contrasted and the succession that was accessible in the Genbank databases. DNA sequencing of algae preformed at Yaazh Genomics, Chennai, and Tamil Nadu. The program PhyML 3.0 aLRT was used for phylogeny analysis.

Results and Discussions

Pure Culture of Algae

The present investigation tests were gathered from 3 unique Sites (Site 1= Sitapura Industrial area site, Site 2=Mansarovar Industrial area site, Site 3=Sanganer Industrial area site) of Amanishah Nala Jaipur. Collected water samples from the site were taken to the laboratory in the plastic bottles and removal of algae was done by cultivated in Chu 10 medium. The culture conditions which control the algal growth was organic, inorganic nutrients, light, temperature, pH and constant mixing or aeration. The algal colony appears after one month of vaccination. Majority of the detachment were separated and identified on bases of morphological appearance culture and the small cell appearance of the divided provinces. Detachment included many normal green algae and cyanobacteria individuals. The isolated strains of microalgae ranged from unicellular to filamentous forms. The colour of the cultures ranged from dark green to brown for the eukaryotic microalgae, while most of the cyanobacteria demonstrated the characteristic blue-green coloration, except for a few brown strains as well. Algal species were identified and counted microscopically.

The identification of algal species was carried out based on the morphological features, unicellular, filamentous, colour, motility, and reproductive structures. Five Algal species (*Oscillatoria*, *Chlorella*, *Nostoc*, *Anabaena*, and *Navicula*) were isolated in the culture samples. All these are the isolates collected from polluted water of Amanishah Nala from different sites.

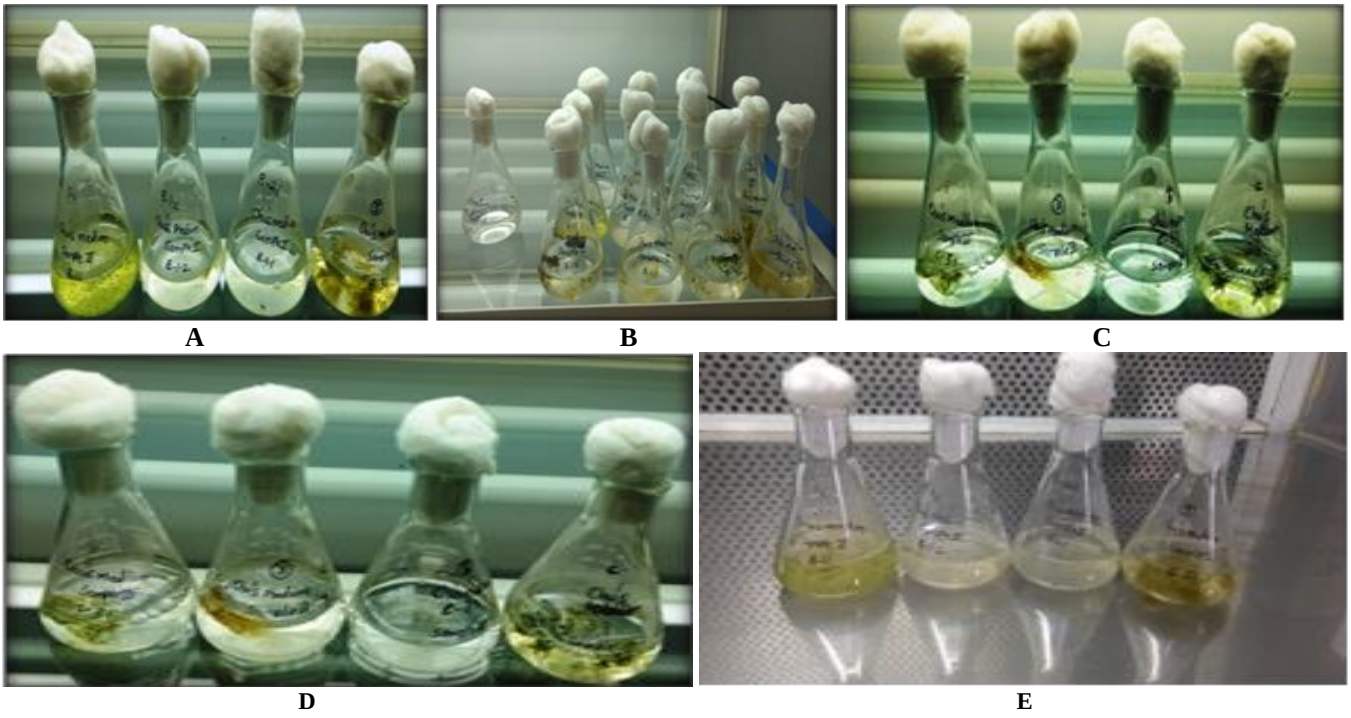

Fig 1: Isolated and identified Algal species in their Pure cultures: A. *Oscillatoria sp*. B. *Navicula sp* C. *Chlorella sp* D. *Nostoc sp*.E. *Anabaena sp*.

Isolated Pure Algal Strains: A total number of Five Algal species were identified during the present study (*Oscillatoria*, *Chlorella*, *Nostoc*, *Navicula*, and *Anabaena*). All these are the isolates identified and collected from contaminated water of Amanishah Nala, which is being contaminated by modern squanders of Jaipur city (Rajasthan state) in India. The algal species images were taken at 100X magnification for the morphological identification.

Oscillatoria: *Oscillatoria* is a family of filamentous *cyanobacterium*. The standard forms have a deep blue-green or brownish colour. Fibres in the settlements can slide forward and backward against one another. It is mostly blue-green or dark coloured green. It shapes a thin blue-green waxy covering on the outside of streaming water. Exponentially growing *Oscillatoria* was inoculated into 100 ml of each test solution taken in 250 ml conical flasks and experiments were conducted. This experiment was performed for 28 days in a culture room lit up with white fluorescent light (2,000 lux) by maintaining a 10/14 light dark cycle at 22°C. Replicates were run in all the experiments. The test organism was observed under microscope and care was taken to record the morphological characteristics including abnormalities.

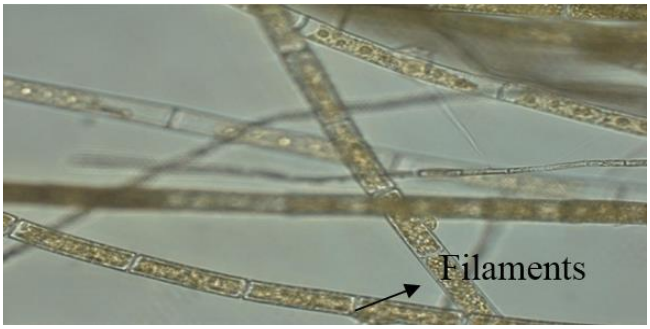

Fig 2: *Oscillatoria sp*

Chlorella: *Chlorella* is a member of *Chlorophyceae* class. They are unicellular, nonmotile green algae. The little cells are nonmotile, round or oval, typically discovered singular; once in a while in a group. The cell protoplast is encased in a film. The growth of these algae is therefore encouraged in sewage disposal plants where it crowds out by its rapid rate

of multiplication and suppresses harmful bacteria. The trials were done in 500 ml polycarbonate Erlenmeyer flask containing 200 ml of culture kept semi-consistently under controlled states of light power (150 µmol), light/dark cycle (16:8 hours), and temperature (20°C). *Chlorella* was cultured on Chu-10 medium and maintained on the same medium by regular subculturing in every two weeks. This acclimation comprised of culture exchanges at the exponential development stage and observing each new culture for its development rate.

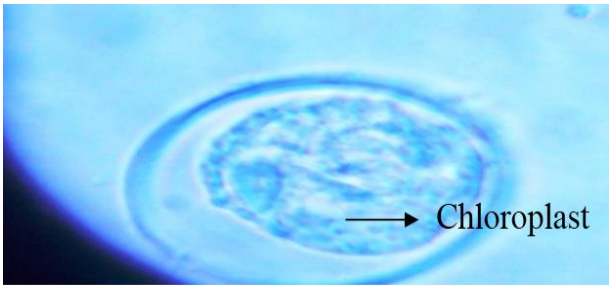

Fig 3: *Chlorella sp*

3. *Navicula*: *Navicula* is a variety of algae which appears in a boat-like sharp, mainly water bodies, eukaryotic, photosynthetic living beings, running in size from a single cell. *Navicula* is a diatom. Mostly found in polluted water. The microalgae, *Navicula* species, was inoculated into Chu 10 medium, and the way of life was hatched for 28days at 21ºC in a thermostatically controlled room and lit up with cool inflorescence lights at a power of 2000 lux in a 12-hour light-dim routine.

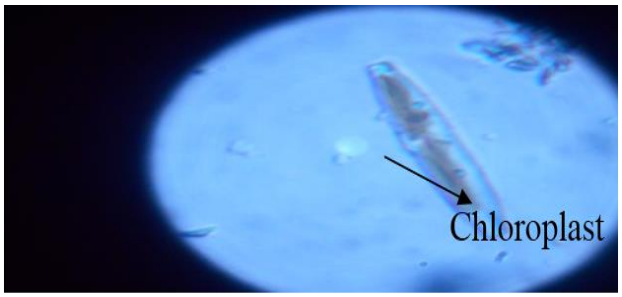

Fig 4: *Navicula* sp

***Nostoc*:** Nostoc sort of blue-green algae with cells arranged in beadlike chains that are assembled in a solidified mass. The microalgae, *Nostoc sp.* was injected into Chu 10 medium. The culture was incubated for 28days at 20ºC under light from 20 W fluorescent lamps in a thermostatically controlled room.

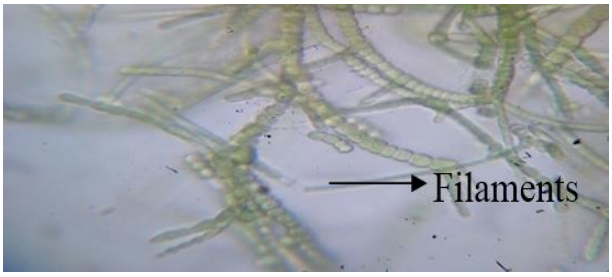

Fig 5: *Nostoc sp*

***Anabaena*:** *Anabaena* genus of blue-green algae. The microalgae, *Anabaena* sp. was injected into Chu 10 medium.

The culture was incubated for 28days at temperature 18 to 22 °C. For lighting, make use of two 48-inch, 40-watt bright light bulbs (plant develop light or wide-range) at a stature of 12 to 18 inches. Start with a light cycle of 16 hours on 8 hours off and diminish to 12 hours on, 12 hours following 7 to 10 days.

Subculture to fresh media each 6 to about two months.

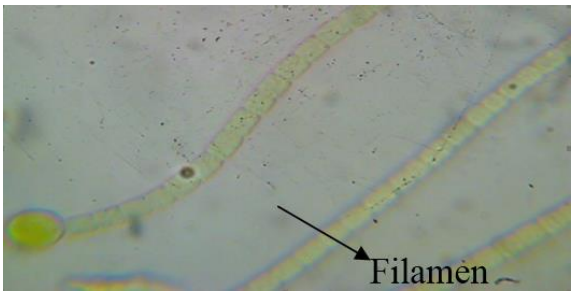

Fig 6: *Anabaena sp*

In the Present Study, the absorption of heavy metal through Algal samples analyzed by double Atomic absorption spectrometer. The reading was taken at an interval of 7, 14 and 21 days.

The chemical compound Zinc sulphate and Manganese sulphate was used as a source of heavy metal as these compounds are found in effluents of wastewater collected from Amanishah Nala to study the bioremediation potential of different algal genera against Zinc and Manganese.

Zinc usually happen in water and soil however zinc focuses in them are raising unnaturally.

Majority of the zinc is included through technical exercises, for example, mining, coal waste, and waste burning and steel preparing.

Water contamination from industrial waste is an outstanding issue. Zinc builds the acidity of water. Zinc sulphate is used in the production of rayon, as a feed supplement, Pharmaceutical and as a fertilizer ingredient

Table 2: Bioremediation Potential study of algal samples against Zinc (January to February, 2018)

S.No	Sample	7 Days(ppm)	14 Days(ppm)	21 Days(ppm)
1	ZN A1.2	3.9	68.3	31.08
2	ZN B1.1	45.47	42.8	8.55
3	ZN B1.2	33.82	37.32	67.18
4	ZN B3.4	38.76	38.87	17.21
5	ZN C3.1	37.78	38.03	36.24
6	ZN C3.4	52.94	51.28	26.48
7	ZN MIX	54.49	53.56	44

***** ZN= Zinc ***** Sample no =ZN A1.2, ZN B1.1, ZN B3.4, ZN B1.2, ZN C3.1, ZN C3.4

Manganese happens typically in a few surface water and groundwater sources. Also, human exercises are likewise in charge of a significant part of the manganese tainting in water in a few territories.

Manganese sulphate is widely used as a product in fertilizers and animal feed. Manganese effects occur mainly in the respiratory tract and brain (Srivastava and Majumder, 2008).

Table 3: Bioremediation Potential study of algal samples against Manganese (January to February, 2018)

S.No	Sample	7 Days(ppm)	14 Days(ppm)	21 Days(ppm)
1	MN A1.2	2.01	1.11	0.36
2	MN B1.1	1.52	1.16	1.15
3	MN B1.2	1.25	2.34	0.98
4	MN B3.4	1.5	0.75	0.03
5	MN C3.1	1.71	1.15	0.14
6	MN C3.4	2.19	2.7	0.15
7	MN MIX	0.16	0.14	0.34

*****MN= Manganese***** Sample no= MN A1.2, MN B1.1, MN B1.2, MN B3.4, MN C3.1, MN C3.4

The (Table 1 and 2) represent the absorption and bioremediation potential of heavy metal by different algal samples. The absorbance of heavy metal by the algal samples was done by double Atomic absorption spectrometer. The reading was taken at an interval of 7, 14 and 21 days against Zinc and Manganese. Sample No. MNB1.1 and ZNB1.2 reported the highest heavy metal absorption limit after 21days against Zinc and Manganese (Table 1 and 2). It was observed 33.82 ppm value after 7days in the sample No ZNB1.2 and after 21 days observed 67.18 ppm in the same sample.

(Table 1) The Sample No ZNB1.2 absorbs the highest amount of Heavy metal Zinc after 21 day's interval of incubation. Similarly sample No MNB1.1 has observed the 1.52ppm value of Manganese absorption after 7days and 1.15 ppm after 21 days (Table 2). The Sample No MNB1.1 absorbs the highest amount of Heavy metal Manganese after 21 day's interval of incubation.

Sequencing of Algae

The Phylogenetic and molecular systematic analysis

Reported and confirmed the presence of *Chlorella Variabilis*, *Chlorococcum diplobionticum*, *Oscillatoria limosa*, *Nostoc spongiaeforme*, and *Anabaena variabilis* as the identified samples with bioremediation characteristics. The sequencing of species confirms the most extreme personalities contrasted and the grouping that was accessible in the Genbank databases.

Results of Sequencing: The program PhyML 3.0 aLRT was used for phylogeny analysis.

Identified Sequence 1: Sample No. B1.1

CACGAGCATCCCACGTCCCTCCTACTCATGGAAGA
CCTCGCACTTAGTCTCCCATGGCCGAGTATAGGCC
AGCGCCGCTTCAGCGCCATCCATTTTCGGGGCTAA
TTGATTCGGCAGGTGAGTTGTTACACACTCCTTAGC
GGATTTCGACTTCCATGACCACCGTCCTGCTGTCTA
TATCAATCAACACCCTTTGTGGGATCTAGGTTAGC
GCGCAGTTTGGCGCCTTAACTCGACTATCGGTTCAT
CCCGCATCGCCAGTTCTGCTTACCAAAAATGGCCC
ACTTGGAGCTCTCATCTAAAGGCCTGGGTTCAATC
AAGCAACCCGGACGTCCACCCTATTTAAAGTTTGA
GAATAGGTCAAGGATGTTACATCCCCTGAACCTCT
AATCATTCGCTTTACCCGACCCTACTGAGACTAGCT
CCCGGCTATCCGGGGGAAACTTTCGAAGGAACCCA
GTTACAAAAGGGTCCAATAAGCCTTTCCCCCTATC
CCCAGTCCAAAAGCGATTTGACGTCACACATCTAC
AACCTCCACCAAGTTTCCTCTGGTTCGACCTGCTCA
GGCTAGTCACCTCTTTCGGTCCCAACAGGATGCTC
GACTCAAACCTTCGCAAAACTCAGGGGCGTCGAGG
TGCGGCACGGCCATCCACAGTCAGTTCTTGCGCTTC
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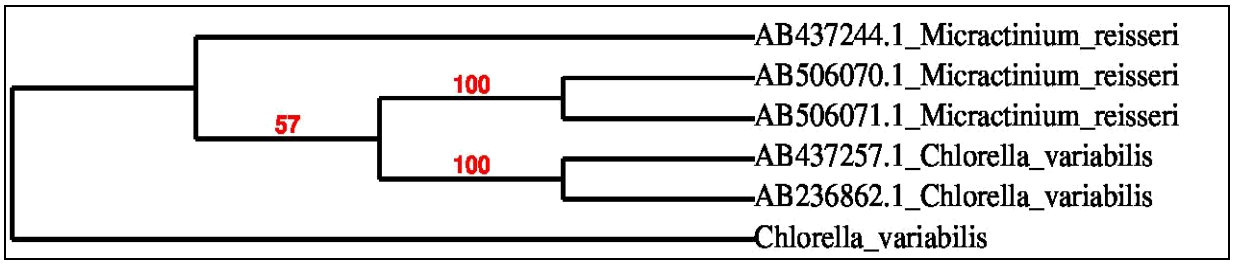

Fig7: Identified Algae: *Chlorella variabilis*

***Chlorella variabilis*:** Algae initially incorporated into the family *Chlorella* are among the most broadly appropriated and every now and again experienced green algae in freshwaters. They are commonly little (~2 to 10 am in breadth), unicellular, coccid, nonmotile, and contain a single chloroplast. Over a hundred algal segregates were initially allocated to the sort Chlorella, yet their scientific classification characterization has since quite a while ago stayed untrustworthy as a result of their absence of visible morphological characters. Later atomic investigations presently separate them into two classes of *Chlorophytes*, the *Trebouxiophyceae*, which contains the genuine *Chlorella*, and the *Chlorophyceae*. Here, we reported on the genome of *Chlorella variabilis* that is a bona fide individual from the pure Chlorella family, having a place with the class *Trebouxiophycea*.

Identified Sequence 2: Sample No. B1.2

TCCGACTTCCATGACCACCGTCCTGCTGTCTATATC
AATCAACACCCTTTGTGGGATCTAGGTTAGCGCGT
AGTTGGGCACCTTAACTCGACTATCGGTTCATCCCG
CATCGCCAGTTCTGCTTACCAAAAATGGCCCACTA
GGAGCTCTGATAGGTTGCGGCAGATCAATCAAGCA
TCCGACGCGTCCCGCCTATTTAAAGTTTGAGAATA
GGTGAAGGATGTTTCATCCCCCGAACCTCTAATCA
TTCGCTTTACCTGACGGTACTCATTTAAGCTCCTGC
TATCCTGGGGGAAACTTCGGAGGGAACCAGCTACT
AGCGTTTGACCCATTCCTCCGTTTGAAGGAACCCCC
TGGGCTCTCCACCTTTTCAGGCTTCCTCCCAAGGGC
TGCGTCTCCGCAGGGACCGACTATATCTTAAGCCT
CTAACAGAGACCCACTGCCATTTAGTCTGTGAACT
GCACGCATAGCTACGAATAGCCTTAGCGCTTGGCT
GCCGATTGACCCTATTCATTGGGTTCTTACCATACC

CGCGACTTTCACCGCGGTGCCCTGTAAGAGCTTTC
GCTCCTAAAGGCGGTACCAATGACTTCAGACGGGT
TGTCCCGGCAATTTGACAGTGTCGCCCTCATTATCA
CGAGGACTAGCGCGTCCCCTTTTCAGGTGCGCTCTT
AACCACCATAGTATCAAATGGTTCGATTAGTCTTTC
GCCCCTATACCCAAGTCCGAAAAGCGATTTGCACG
TCAGCACATCTACGAGCCTCCACCAGAGTTTCCTCT
GGCTTCACCCTGCTCAGGCATAGTTCACCATCTTTC
GGGTCCCAACAGGTATGCTCGCACTCAAACCTTTC
ACAGAAGATCATGGTCGGTCGATGGTGCAGGCACA
GGCCATCCCACCAGTCAGGTTACTTGCGCTTCATG
GGTTTTCCACCCACCAACTCGCATACATGTTAGACT
CCTTGGTCCGTGTTTCAAGACGGGTCGATTGAAGG
GCTTCTGCCAGCATCTTGAGGACGCAGTTCCCGAA
GGACTGAGCGCCCTTGACGCCTTGGTCAGCCAGGC
GGCATAGACGGGGTATCAACCCCCGCTTTTATCCC
GCCCGGCTAACCCATGCTGACCAGCACCCAGCACA
TGCAGCGGCCCGTTAGGGACGCATAAGCCTGGGCG
CACCCACACCCTCCAATCGCTTCCCTCTCAACAATT
TCAAGCACTTTTTAACTCTCTTTTCAAAGTTCTTTTC
ATCTTTCGTTCACACTACTTGTTCGCTATCGGTCTC
TCGCCAGTATTTAGCCTTAGAACGGATTTACGTCCC
ATTTTGGGCTGCATTCCCAAACAACCCGACTCGTG
GAAAGCACCTCGTGGAGCAGCTAAACCGAGAGCC
GACGGGGTTCTCACCCTCTCTGACGCCGCTTTCCAG
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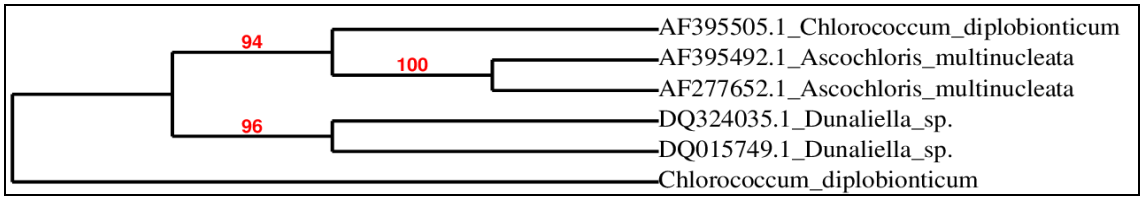

Fig 8: Identified Algae: *Chlorococcum diplobionticum*

***Chlorococcum diplobionticum*:** *Chlorococcum* is a genus of green algae. *Chlorococcum diplobionticum* cells are solitary, spherical forming a thin layer in a submerged substrate. Chloroplasts parietal covering almost the entire cell.

Conclusion

During the study, all of microalgae samples collected from different industrial sites of Amanishah Nala Jaipur. Five strains of algae: *Oscillatoria, Chlorella, Nostoc, Navicula* and *Anabaena* were selected, cultured, taxonomically identified and characterized. The sequence of species obtain in this examination confirmed, the most extreme characters contrasted and the arrangement that was accessible in the Genbank databases. The phylogenetic and systematic analysis of *Chlorella variabilis, Chlorococcum diplobionticum*, can be controlled by an atomic methodology using the sequencing. *Chlorella variabilis* and *Chlorococcum diplobionticum* was best bioremediation potential species of algae, which was isolated from the Nala water. They both have the highest capacity of metal absorption and showed pollution indication.

References

1. Brook AJ, Planktonic Algae as Indicators of Lake Types with Special Reference to The Desmidiaceae. Limnol and Oceannog. Limnology and Oceanography Publication. 1965; 10(3):403-411. DOI:- https:// doi. org/10.4319/lo.1965.10.3.0403
2. Foster P, Concentrations and concentration factors of heavy metals in brown algae. Environmental Pollution. 1976; 10(1):45-53. DOI: - https://doi.org/10.1016/0013-9327(76)90094-X
3. MacKenthun KM, Radioactive wastes, 1st edn. U.S.: U.S. Printing Office, 1969.
4. Mani D, Kumar C, Biotechnological advances in bioremediation of heavy metals contaminated ecosystems: an overview with special reference to phytoremediation. International Journal of Environmental Science and Technology. 2014; 11(3):843-872. DOI: - https://doi.org/10.1007/s13762-013-0299-8
5. Palmer CM. 'A Composite Rating of Algae Tolerating Organic Pollution', Journal of Phycology. 1969; 5(1):78-82. DOI:-https://doi.org/10.1111/j.1529-8817.1969.tb02581.x
6. Paswan G, Kumar N. 'Bio Purification of Waste Water through Algae', International Journal of Engineering and Technical Research. 2014; 2(4):71-72.
7. Phillips DJ, The use of biological indicator organisms to monitor trace metal pollution in marine and estuarine environments-a review. Environmental Pollution. 1977; 13(4):281-317. DOI: -https://doi.org/ 10.1016/ 0013-9327(77)90047-7
8. Pinto E, Sigaud kutner TC, Leitao MA, Okamoto OK, Morse D, Colepicolo P, *et al*. Heavy metal–induced oxidative stress in algae. Journal of phycology. 2003; 39(6):1008-1018. DOI:-https://doi.org/10.1111/j.0022-3646.2003.02-193.x
9. Sharma R, Singh GP, Sharma VK. Comparison of different media formulations on growth, morphology and chlorophyll content of green alga, Chlorella vulgaris. International Journal of Pharmacy and Biological Sciences. 2011; 2(2):B509-B516. https:// www.researchgate.net/publication/279603698_Comparison_of_different_media_formulations_on_growth_morphology_and_Chlorophyll_content_of_green_alga_Chlorella_vulgaris
10. Srivastava NK, Majumder CB. Novel biofiltration methods for the treatment of heavy metals from industrial wastewater. Journal of hazardous materials. 2008; 151(1):1-8. DOI:- https://doi.org/10.1016/j.jhazmat.2007.09.101
11. Volesky B, Biosorption and biosorbent', Biosorption of Heavy Metals. 2nd edn. Florida: CRC press, 1990, 280-285.
12. Welz B, Sperling M. Atomic absorption spectrometry. John Wiley & Sons, 2008.

European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 2, 2020

ROLE OF HOMOEOPATHY IN MANAGEMENT OF COVID-19 COMPLICATIONS

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INTRODUCTION

First time on December 30, 2019, a report of a cluster of pneumonia of unknown aetiology was published on ProMED-mail, possibly related to contact with a seafood market in Wuhan, China. [1] Following this till October 15, 2020, **38,394,169 confirmed cases** of COVID-19, including **1,089,047 deaths** have been reported to World Health Organization. [2]

First time, this case was reported on December 31, 2019 by WHO Country Office in China but based on symptoms; its beginning can be traced in initial days of December 2019. Initially for first few cases (n=29), this infection was classified as "pneumonia of unknown etiology." Following intensive outbreak investigation by the Chinese Center for Disease Control and Prevention (CDC) and local CDCs, this infection was classified as novel viral infection belonging to the coronavirus (CoV) family. Finally on February 11, 2020, the WHO Director-General, Dr. Tedros Adhanom Ghebreyesus, announced that the disease caused by this new CoV was a "COVID-19," which is the acronym of "coronavirus disease 2019". [3] This Coronaviruses are encapsulated, single-stranded RNA viruses that generally cause mild, cold-like illnesses in human beings and belongs to SARS-coronavirus-2 (SARS-CoV-2). [4]

Since December 2019, COVID-19 information has much evolved. Much information has been gathered about its transmission, symptomatology, diagnosis, treatment and prevention. Many clinical trials are undergoing regarding its vaccination. Along with this, many case reports have suggested about probable complications which arises during either the stage of illness or convalescence periods. These long-term effects of surviving COVID-19 have become a new focus of attention for clinicians and researchers. [5]

LONG COVID [COVID-19 Post-Intensive Care Syndrome]

Post-intensive care syndrome (PICS) refers to a patient with new or worsening impairment in any physical, cognitive, or mental domain after critical illness or intensive care. These impairments persist beyond the intensive care unit (ICU) hospitalization. PICS impairments often last more than a year and have a profound impact on patients' quality of life, as well as

that of their family members, known as PICS-F. Individuals with PICS-F are most commonly affected in the domain of mental health. As many as 40% of patients with PICS are unable to return to their former level of function, resulting in job loss and financial difficulties that can further complicate access to healthcare. Iatrogenic complications from polypharmacy and fragmentation of care also impact patient recovery as there is often a mismatch between the support needed relative to the support provided. [6]

"Long covid" is the term that is being used to describe illness in people who have recovered from covid-19 but are still report lasting effects of the infection or have had the usual symptoms for far longer than would be expected. [7] It includes COVID-19-associated acute respiratory distress syndrome, and involves persistent inflammation, immunosuppression, and catabolism. Substantial cardiovascular morbidity and mortality accompany PICS, even in young, fit populations without traditional cardiovascular risk factors. [5] Many people, including doctors who have been infected, have shared their anecdotal experiences on social media, in the traditional media, and through patient's groups. [7]

Patients with COVID-19 treated in the ICU that survive may be at higher risk for developing PICS given the constraints on social support (restricted visitation), prolonged mechanical ventilation with exposure to higher amount of sedatives, and limited physical therapy during and after hospitalization given the risk of disease transmission. [6]

The post- COVID- 19 manifestation is largely similar to the post- SARS syndrome. [8] In a study from the post-SARS era, it was observed that patients develop long term fatigue, diffuse myalgia, weakness, depression, and sleep-disordered breathing. It also increases the chances of higher rates of PTSD, depression, and substance abuse for patients, families, and health care workers. [6]

Patients with severe illness due to COVID-19 often develop critical illness with hypoxemic respiratory failure, most commonly ARDS. [6] Intensive care unit (ICU) stays of patients with ARDS are lengthy and characterised by severe hypoxaemia, extrapulmonary organ failures, and a marked inflammatory response. Organs undergo microscopic damage at the time of acute inflammation and display imperfect repair, with acute kidney injury and cardiovascular dysfunction transitioning to chronic kidney disease and post-ICU major adverse cardiac events [5] It could also lead to serious systemic consequences affecting most of the major organs including the digestive tract, liver and pancreas. [9] A study has found that in patients who had recovered from COVID-19, 87.4% reported persistence of at least 1 symptom upto 60 days after onset of first COVID-19 symptoms. [10] Another study has suggested that Survivors of the critically ill new type of coronavirus pneumonia (COVID-19) patients still have post-ICU syndrome (PICS) manifestations of varying degrees after leaving the ICU, and comprehensive respiratory rehabilitation interventions is required. [11]

In a study about 90 % patients report symptoms even after recovery from COVID-19 and only 10.8 % of all subjects have no manifestation. Subjects post recovery suffered from several symptoms and diseases. The most common symptom reported was fatigue (72.8 %), more critical manifestations like stroke, renal failure, myocarditis, and pulmonary fibrosis were reported by a few percent of the subjects. There was a relationship between the presence of other comorbidities and severity of the disease. Also, the severity of COVID- 19 was related to the severity of post- COVID- 19 manifestations. [8]

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chances of higher rates of PTSD, depression, and substance abuse for patients, families, and health care workers. [6] Some previous studies related to ARDS have shown that the case fatality rate of patients admitted to the ICU due to ARDS or sepsis within 12 months after discharge is 40%~50%. 50%~70% of survivors have cognitive dysfunction, 60%~80% Of survivors have physical dysfunction, and up to 30% of ARDS survivors will suffer from post-traumatic stress disorder (PTSD). Among them, elderly patients with previous depression and low socioeconomic groups are more affected. [11]

Heart conditions associated with COVID-19 include inflammation and damage to the heart muscle itself, known as myocarditis, or inflammation of the covering of the heart, known as pericarditis. COVID-19, especially in older people with underlying illness may cause severe disease and death that may involve heart damage. Young adults with COVID-19, including athletes, can also suffer from myocarditis. [12] Severe coagulopathy is also seen in patient with COVID-19 pneumonia possibly due to its multifocal thromboembolic disease involving the pulmonary, cerebral, and renal circulations include coagulopathy due to COVID-19 versus cardioembolic cause in the setting of atrial fibrillation. [13] COVID-19 pneumonia seems to have role as a precipitant factor for acute venous thrombo-embolism. [14]

HOMOEOPATHY IN LONG COVID

Scientific evidence in various epidemics clearly showcase that Homoeopathy can be used both therapeutically and /or as prophylactic with success using approaches like Genus epidemicus, nosodes etc. Its greatest successes have been recorded in the prevention & treatment of flu like illnesses. [15] Homeopathy have given the best results during pandemics even in Hahnemann time, when the mortality was very less in Homoeopathy in compare to modern medicine. [16] Homeopathy is a system of therapeutics based on law of similars. “Like cures like” ‘Similia Similibus Curentur’. It is an universal law, where patient is prescribed a similimum on the basis of ‘Totality of Symptoms’. The disease is a reaction of the patient to unfavourable environment factors and that this reaction manifests through signs and symptoms the patterns of this reaction and the essence of these sign and symptoms gives totality of symptoms. [17] The physician relies on the wholeness of symptoms revealed during the entire evolution of the infection, and prescribes an ultra - high diluted succussed solution product which has been proven to heal similar conditions. This is a great advantage in this timing while Covid-19 disease is in rapid development, because the diagnosis of the indicated ultra-high diluted succussed solution product is based on individual symptoms (if these are very characteristic) or on the totality of symptoms, and not in the pathology. [18]

Homoeopathic medicines that can help in managing Long COVID complications are:

1. **GELSEMIUM-** It acts upon the nervous system, causing various degrees of motor paralysis. General prostration with Muscular weakness. Dizziness, drowsiness, dullness, and trembling is present along with Slow pulse, tired feeling, mental apathy. [19] Complete relaxation and prostration of whole muscular system with entire motor paralysis. Desire to be quiet, to be let alone; does not wish to speak or have any one near her, even if the person be silent. Lack of muscular co-ordination; confused; muscles refuse to obey the will. [20] The heart is feeble and the pulse is feeble, soft and irregular. There is palpitation during the febrile state. Palpitation, with weakness and irregularity of the pulse. [21] It is accompanied by extreme restlessness from threatened suffocation. [22]
2. **PHOSPHORICUM ACIDUM-** "Debility" is very marked in this remedy, producing a nervous exhaustion. Mental debility first; later physical. [19] Is listless, apathetic; indifferent to the affairs of life; prostrated and stupefied with grief; to those things that used to be of most interest. [20] The patient pines and emaciates, grows

weaker and weaker, withered in the face; night sweats; cold sweat down the back; cold sweats on the arms and hands more than on the feet; cold extremities; feeble circulation, feeble heart; catches cold on the slightest provocation and it settles in the chest; dry, hacking cough; catarrhal conditions of the chest; tuberculosis; pallor with gradually increasing weakness and emaciation. [21]

3. **ARSENICUM ALBUM-** It includes exhaustion, and restlessness, with nightly aggravation, are most important. Great exhaustion after the slightest exertion. This, with the peculiar irritability of fiber, gives the characteristic irritable weakness. [19] There is Great prostration, with rapid sinking of the vital force with mental restlessness, but physically too weak to move; cannot rest in any place: changing places continually; fear of death; thinks it useless to take medicine, is incurable, is surely going to die. [20] The surface of the body is pale, cold, clammy, and sweating, and the aspect is cadaveric. Anxiety, restlessness, prostration, burning and cadaveric odors are prominent characteristics. [21]
4. **CHELIDONIUM MAJUS-** A prominent liver remedy, covering many of the direct reflex symptoms of diseased conditions of that organ. The jaundiced skin, and especially the constant pain under inferior angle of right scapula, are certain indications. [19] Constant pain under the lower and inner angle of right scapula. Patient suffers from Constipation with hard, round balls stool like sheep's dung. There may be alternate constipation and diarrhoea. [20] There is Congestion and soreness in the liver, with jaundice. Right-sided pneumonia, complicated with liver troubles, or jaundice. [21]
5. **ANTIMONIUM TARTARICUM-** Through the pneumogastric nerve it depresses the respiration and circulation. [20] Clinically, its therapeutic application has been confined largely to the treatment of respiratory diseases, rattling of mucus with little expectoration has been a guiding symptom. There is much drowsiness, debility and sweat. [19] when the patient coughs there appears to be a large collection of mucus in the bronchi; it seems as if much would be expectorated, but nothing comes up. [20] The face is covered with a cold sweat and is cold and pale. In cases of pneumonia; when first coming down with a chill, it may be a very violent attack, such an attack as from its violence produced prostration early. [21] Paroxysms of coughing, with suffocating obstruction of respiration, dyspnœa, compelling one to sit up, shortness of breathing from suppressed expectoration. [22]
6. **BAPTISIA-** The symptoms of this drug are of an asthenic type, simulating low fevers, septic conditions of the blood, malarial poisoning and extreme prostration. Indescribable sick feeling. Great muscular soreness and putrid phenomena always are present. All the secretions are offensive-breath, stool, urine, sweat, etc. Epidemic influenza. Chronic intestinal toxæmias of children with fetid stools and eructations. [19] Patient has aversion to mental exertion; indisposed, or want of power to think. Perfect indifference; don't care to do anything, inability ot fix the mind to work. [20] There is stupor, patient falls asleep whilst being spoken to, confused as if drunk. He cannot keep his mind together, a wild wandering feeling. This scattered feeling is further exemplified in the illusion that the body is double; limbs separated and conversing with each other; can't sleep because body seems scattered about and cannot collect pieces. There is a dull heavy sensation in head with drowsiness and heavy eyelids. [22]
7. **HYDROCYANIC ACID-** Convulsions and paralysis are the leading notes of the medicine’s action. It acts on the medulla and through the vagus nerve on heart and respiration. The breathing is irregular and gasping. The heat is greatly disturbed, blueness and coldness of surface, pulse feeble, imperceptible. Respiration profound,

frequent, and stertorous. Anxious respiration. Paralysis of the lungs. Violent constriction of the diaphragm, with a sense of suffocation. Tightness of the chest (first and second days). Tightness of the chest, gradually extending into the right side of the chest and becoming a pain which extends over the whole chest and makes breathing difficult (third day). Pressure and tightness in the chest (first day). Pressive pain in the chest. [23]

8. **LAUROCERASUS-** Dyspnoea, with sensation as if lungs would not be sufficiently expanded, or as if pressed against spine. Spasmodic oppression of chest. Gasping, suffocating spells; clutches at heart; palpitation. Cough is dry, almost constant, titillating cough; throat and mouth feel as if burnt with whistling sound. Cough, with evening aggravation, severe cramps in chest, and rapid sinking of vital forces. [23]
9. **NAJA TRIPUDIANS-** Uneasiness and dull, heavy pain in chest. Lancinating pains that aggravates on deep inspiration. Asthmatic constriction of chest; cannot expand lungs; followed by mucous expectoration. Pain in left pectoral muscles in forenoon. [22] Suicidal insanity, broods constantly over imaginary troubles. Simple hypertrophy of heart. For restoring a heart damaged by acute inflammation, or from relief of sufferings of chronic hypertrophy and valvular lesions. [20] Angina pains extending to nape of neck, left shoulder and arm with anxiety and fear of death. Damaged heart after infectious diseases. Marked symptoms of low tension. [19]
10. **PHOSPHORUS-** Hard, dry, tight, racking cough with congestion of lungs. Sweetish taste while coughing. Burning pains, heat and oppression of chest. Tightness across chest with great weight on chest. Sharp stitches in chest; respiration quickened, oppressed. Much heat in chest. Pneumonia, with oppression; worse, lying on left side. Whole body trembles, with cough. Violent palpitation with anxiety, while lying on left side. Pulse rapid, small, and soft. Heart dilated, especially right. Feeling of warmth in heart. [19] Sensation of fatigue in chest. Congestion in chest, with sensation of heat which ascends to throat. Anxiety about heart with nausea and a peculiar hunger, somewhat > by eating, distressing even in bed. [22]
11. **CROTALUS HORRIDUS-** Action feeble, pulse tremulous. Palpitation, especially at menstrual period. Trembling feeling of heart. Cough, with bloody expectoration. Tickling from a dry spot in larynx. [19] Hoarseness, with weak, rough voice. Bruised pain from larynx to chest. Cough with stitch in left side and bloody expectoration. Excessive oppression of chest. Burning in chest with heat in forehead. Pneumonia with tendency to gangrene. Lungs seem passive. Much pain in heart, through left shoulder-blade and down left arm. Palpitation with sore pain in and about heart; feeling as if heart tumbled over. Heart tender when lying on left side. Pulse hardly perceptible. Phlebitis; varicosis; varicocele. [22]
12. **CARBO VEGETABILIS-** Cough with itching in larynx; spasmodic with gagging and vomiting of mucus. Deep, rough voice, failing on slight exertion. Hoarseness; worse, evenings, talking; evening oppression of breathing, sore and raw chest. Wheezing and rattling of mucus in chest. Occasional spells of long coughing attacks. Cough, with burning in chest; worse in evening, in open air, after eating and talking. Spasmodic cough, bluish face, offensive expectoration, neglected pneumonia. Breath cold; must be fanned. Hćmorrhage from lungs. [19] For the bad effects of exhausting diseases, whether in young or old; cachetic persons whose vitality has become weakened or exhausted. Persons who have never fully recovered from the exhausting effects of some previous illness. Ailments from use of quinine. Bad effects from loss of vital fluids; haemorrhage from any broken down condition of mucous membranes. In the last stages of disease, with copious cold sweat, cold breath, cold tongue, voice lost, this remedy may save a life. [20] Laboured respiration and shortness of breath,

while walking. Wheezing and rattling of mucus in the chest. Great difficulty of respiration, and oppression of the chest. Frequent want to take a deep inspiration. Want of breath, esp. in the evening in bed. Compression and cramp-like constriction in the chest. The chest is tight, with a sensation of fullness and anxiety. [22]

13. **ARNICA MONTANA-** The face or head and face alone is hot, the body cool. Unconsciousness; when spoken to answers correctly but unconsciousness and delirium at once return. Says there is nothing the matter with him. [20] Angina pectoris; pain especially severe in elbow of left arm. Stitches in heart. Pulse feeble and irregular. Cardiac dropsy with distressing dyspnœa. Fatty heart and hypertrophy. Coughs depending on cardiac lesion, paroxysmal, at night, during sleep, worse exercise. Dyspnœa with hæmoptysis. Influenza. Thrombosis. Hematocele. [19,23,24] Respiration short, panting, difficult, and anxious. Rattling in the chest. Oppression of the chest and difficulty of breathing. Respiration frequently slow and deep.[25-28] Shootings in the chest and sides, with difficulty of respiration, aggravated by coughing, but breathing deeply, and by movement; better from external pressure. Beating and palpitation of the heart. Pain from liver up through left chest and down left arm, veins of hands swollen, purplish; sudden pain as if heart squeezed or had got a shock (angina pectoris). [29-33]

REFERENCES

[1] Bogoch, Isaac I et al. "Pneumonia of unknown aetiology in Wuhan, China: potential for international spread via commercial air travel." *Journal of travel medicine* vol. 27,2 (2020): taaa008. doi:10.1093/jtm/taaa008

[2] WHO Coronavirus Disease (COVID-19) Dashboard [Updated 2020 October 15]. Available from- https://covid19.who.int/

[3] Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation, and Treatment of Coronavirus (COVID-19) [Updated 2020 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554776/\

[4] Saber, T., Hawsawi, N. M., alharthi, A. hassen, algethami, M. hamad, alnefaie, R. A., asiri, A. abdul R., & Saber, T. " Prevalence and Antibiotic Sensitivity Pattern of Asymptomatic Bacteriuria among Female Students and Staff of College of Applied Medical Sciences, Taif University. *Journal of Medical Research and Health Sciences*, *3*(1) (2020), 862-867. https://doi.org/10.15520/jmrhs.v3i1.151

[5] Valeria, J.-B. M., Ilinova, M.-U., Michelle, R.-L. B., Jesús, Q.-V. B. de, Margarita, C.-H. M., L, S.-J., Bogarín, E. L. U., & Riveros, I. A. (2019). Specific Chemotherapy Treatments for Patients with Ovarian Endodermal Sinus Tumors. *Journal of Current Medical Research and Opinion*, *2*(01), 76-79. https://doi.org/10.15520/jcmro.v2i01.118

[6] Kommoss FKF, Schwab C, Tavernar L, Schreck J, Wagner WL, Merle U, Jonigk D, Schirmacher P, Longerich T: The pathology of severe COVID-19 related lung damage— mechanistic and therapeutic implications. Dtsch Arztebl Int 2020; 117: 500–6. DOI: 10.3238/arztebl.2020.0500

[7] Bangash MN, Owen A, Alderman JE, Chotalia M, Patel JM, Parekh D. Comment COVID-19 recovery : potential treatments for post-intensive care syndrome. Lancet Respir [Internet]. 2020;2600(20):20–2. doi: 10.1016/S2213-2600(20)30457-4

[8] Celikhisar, H., & Ilkhan, G. D. " Determining The Etiological Factors in Pleural Fluid by Crp, Albumin And Procalcitonin Levels. *Journal of Medical Research and Health Sciences, 3*(2) (2020), 880-885. https://doi.org/10.15520/jmrhs.v3i2.157

[9] Biehl M, Sese D. Post-intensive care syndrome and COVID-19 - Implications post pandemic. Cleve Clin J Med. 2020 Aug 5. doi: 10.3949/ccjm.87a.ccc055.

[10] Pal, D. N., Subramanian, D. T., John Bosco, D. A., & Chawda, D. V. (2019). Comparative Study Of The Effect Of Topical Corticosteroid With Non-Steroidal Anti Inflammatory Agents On Post-Operative Inflammation And Corneal Astigmatism After Cataract Surgery. Journal of Current Medical Research and Opinion, 2(02), 95-99. https://doi.org/10.15520/jcmro.v2i02.133

[11] Elisabeth M. Covid-19: What do we know about "long covid"? *BMJ* 2020; 370 :m2815

[12] Tolba M, Abo Omirah M, Hussein A, Saeed H. Assessment and Characterization of Post-COVID-19 manifestations. Int J Clin Pract. 2020 Sep 29:e13746. doi: 10.1111/ijcp.13746.

[13] Hunt RH, East JE, Lanas A, Malfertheiner P, Satsangi J, Scarpignato C, Webb GJ. COVID-19 and Gastrointestinal Disease. Implications for the Gastroenterologist. Dig Dis. 2020 Oct 9. doi: 10.1159/000512152.

[14] Harvey, D. F. "Physician Burnout Quality of Life/ Wellness Resource Pilot Program. *Journal of Medical Research and Health Sciences*, *3*(2) (2020), 886-912. https://doi.org/10.15520/jmrhs.v3i2.160

[15] Carfì A, Bernabei R, Landi F; Gemelli Against COVID-19 Post-Acute Care Study Group. Persistent Symptoms in Patients After Acute COVID-19. JAMA. 2020 Aug 11;324(6):603-605. doi: 10.1001/jama.2020.12603.

[16] MANSOUR, M., & Ahmedana, S. E. " Assessment of Post Exposure Prophylaxis (PEP) in Omdurman Voluntary Counselling and Testing Center (OVCTC). Journal of Medical Research and Health Sciences, 3(1) (2020), 836-849. https://doi.org/10.155 20/jmrhs.v3i1.145

[17] R. Oumchiche, M.DJaafer, M. N. H. W. (2019). Giant Occipito Cervical Lipoma Case Report and Reviewof Literature. Journal of Current Medical Research and Opinion, 2(04), 129-132. https://doi.org/10.15520/jcmro.v2i04.138

[18] Respiratory Physician Branch of Chinese Medical Doctor Association, Respiratory Rehabilitation Professional Committee of Chinese Rehabilitation Medicine Association. Recommendations for respiratory rehabilitation after ICU syndrome in critically ill patients with new coronavirus pneumonia[J/OL]. Chinese Journal of Tuberculosis and Respiratory, 2020, 43 (2020-06-01).http://rs.yiigle.com/yufabiao/1198408.htm. DOI: 10.3760/cma.j.cn112147-20200512-00592.

[19] Long-Term Effects of COVID-19 [Internet]. CENTERS FOR DISEASE CONTROL AND PREVENTION. [cited 2020 Oct 17]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects.html

[20] Lushina N, Kuo JS, Shaikh HA. Pulmonary, Cerebral, and Renal Thromboembolic Disease in a Patient with COVID-19. Radiology [Internet]. 2020 Apr 23;296(3):E181–3. doi: /10.1148/radiol.2020201623

[21] Danzi GB, Loffi M, Galeazzi G, Gherbesi E. Acute pulmonary embolism and COVID-19 pneumonia: a random association? Eur Heart J. 2020;41(19):1858.

[22] Makhubele, H. D., & Bhuiyan, M. M. " Primary Malignant Melanoma of the Breast: Mankweng Breast Oncology Experience. *Journal of Medical Research and Health Sciences*, *3*(3) (2020), 900-902. https://doi.org/10.15520/jmrhs.v3i3.185

[23] Chaudhary A, Khurana A. A review on the role of Homoeopathy in epidemics with some reflections on COVID-19 (SARS-CoV-2). Indian J Res Homoeopathy 2020;14:100-9
[24] Acikgoz, Y., Bal, Öznur, & Dogan, M. (2019). Is There a Novel Prognostic Parameter for Well-Differentiated Neuroendocrine Tumours?. Journal of Current Medical Research and Opinion, 2(06), 184-189. https://doi.org/10.15520/jcmro.v2i06.177
[25] Santhanam J. Homoeopathy and covid-19. IJHS. 2020; 4(2):85–91. Available From- https://www.homoeopathicjournal.com/articles/152/4-2-4-716.pdf
[26] Gupta G. Sharma H. Anxiety Disorders And Homoeopathy. Homoeopathica Informatica Bulletin. 2020; 6(2):5-9
[27] Kalliantas D, Kallianta M, Karagianni CS. Homeopathy combat against coronavirus disease (Covid-19) [published online ahead of print, 2020 Jun 5]. *Z Gesundh Wiss*. 2020;1-4. doi:10.1007/s10389-020-01305-z
[28] Almeselt, A., Alsultan, A., Althowaini, N., & ALOraini, R. (2019). Career Objectives of Graduating Dental Students of Riyadh ELM University in Riyadh City an Analytical Study. Journal of Current Medical Research and Opinion, 2(06), 169–173. https://doi.org/10.15520/jcmro.v2i06.168
[29] Boericke W. Boericke's New Manual of Homeopathic Materia Medica with Repertory. 9th Ed. New Delhi: B Jain Publishers(P) Ltd.; 2007.
[30] Allen HC. Allen's Keynote With Leading Remedies of the Materia Medica & Bowel Nosodes. 9th Ed. New Delhi: B Jain Publishers(P) Ltd.; 1999.
[31] Kent JT. Lectures on Homoeopathic Materia Medica. Low Price Edition. New Delhi: B Jain Publishers(P) Ltd.; 2002.
[32] Clarke JH. A Dictionary of Practical Materia Medica Student Edition. New Delhi: B Jain Publishers(P) Ltd.
[33] Dodig-Soklic Z. Two Small Remedies For Respiratory Distress Syndrome (ARDS) [INTERNET]. [Cited on: October 20, 20202] Available from: https://hpathy.com/homeopathy-papers/two-small-remedies-for-respiratory-distress-syndrome-ards/

European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 2, 2020

An Observational Study on Cell Phone Dependence Disorder and it's Homoeopathic Management

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Abstract: Need and Background of the Study: As this problem is increasing day by day there is a need to find out a solution either in the form of psychotherapy or medicinal treatment. Here we are trying to enlighten the scope of psychotherapy and Homeopathic management in treating the cell phone dependence disorders.

The recent advancement related to speed and decreased cost of internet data has increased the use of Cellphones throughout the world. Cellphones are being updated very frequently by improving their design and functions, which is responsible for overdependence, overuse and addiction to the screens. Homoeopathic system of medicine can reduce this tendency of overuse and addiction to Smartphone.

Key-words: Cell phone dependence disorder, Cell Phone Addiction, Observational study, Homoeopathy

Introduction

With the development of India and access of common men to smartphones cell phone addiction is also increasing, which is common in youth & is responsible for the loss of precious time in school or college going and the working youth. A very larger part of the world population own at least one Smartphone or have access to a Smartphone. Smart phones are basically invented to reduce our time and work, we can operate many gadgets and functions at a time without carrying

them separately. Camera, games, newspapers, Watch, different software, music and video players, TV and many things in single compact device. This increases our dependence on Smartphone and ultimately it may lead to dependence disorder and addictions.

Signs and Symptoms of Cell Phone Addiction

- ✓ A compulsion to use the cell phone more often in order to experience the same desired consequence.
- ✓ Repeated failed attempts to use cell phone for less time.
- ✓ Compulsion with Smartphone use.
- ✓ Using cell phone when experiencing unwanted feelings such as sadness, fear, anxiety or depression.
- ✓ Excessive use leading to loss of sense of time.
- ✓ Taking relationship or job at risk due to excessive cell phone use.

General Physical Effects of Addiction of Smartphone

- **Neck problems**.
    - Neck pain resulting from looking down at cell phone or tablet for too long also commonly referred as "text neck"
- **Effects on eyes**
    - Discomfort and pain in eye balls due to constantly looking at cell phone for longer time
    - Burning and itching of eyes.
    - Glare and blurring of vision
    - Fatigue of vision
    - Congestive headache due to over use of eyes
- **Increased illnesses due to over exposure and contamination with Bacteria and viruses.**
    - Due to use of Cell phone in Toilets and Bathrooms there are maximum chances of exposure to Bacteria and viruses which do not get washed after use as phones are not sanitized after coming from toilets.
    - Bacteria like Salmonella and E. coli are found on many phones, which can cause vomiting, diarrhea and fever
    - Painful abscesses on Skin and other body parts
- **Vehicle accidents**.
    - Lots of people use their phones while driving, but this causes significant impairment and puts the driver and others on the risk.
    - Texting and driving is as dangerous as drinking and driving.

- **Male infertility**.
    - Exposure to cell phone radiation has found to be related with reduced sperm count, sperm motility and viability.

Psychosocial Effects of Smartphone Addiction

Disturbances of pattern of Sleep

- Smartphone addiction has been related to an increase in sleep pattern disorders and fatigue.
- Using your Smartphone before bed increases the chances of insomnia or sleeplessness.
    - Sleep quality may decrease due to Bright light of screen.
    - Time required to fall asleep may increase due to screen of Smartphone.
    - Light emitted from the screen of Smartphone may activate the brain.

- **Depression** and **OCD**
- **Relationship problems**: Decreased sense of responsibility cause disturbance in Offline relationships which could suffer as a result of ignoring in favor of excessive cell phone and social media
- **Anxiety**: Students who use Cell phone for longer time tend to become incompetent and lose their confidence this leads to anxiety during stressful events.

Psychotherapy Suggestions for Cell phone addiction

The cell phone addiction is a fairly new concept and isn't yet included in the DSM-5, there are a few therapy suggestions for those suffering from this condition:

- **One should make rules for them self** concerning phone usage.
    - Time periods should be set in which you shouldn't use your phone.
    - Activities in which phone is forbidden should be designated (e.g., driving, lunch and dinner time).
    - Break times to access your phone or social media should be scheduled.
- **Relaxation techniques such as Yoga, Meditation, Pranayam, mindfulness** can help to bring down cravings to use your cell phone or access social media.
- **Individual therapy**: The therapist works with patient to address any underlying problems or co-occurring mental disorders that could be affecting cell phone use.
    - **Cognitive-behavior therapy** aims to replace faulty and maladaptive thoughts, feelings, emotions and behaviors into healthy and positive ones. This method has been proven effective to treat Internet addiction, which is very similar to cell phone addiction.
    - **Motivational interviewing** by Experts: is centered on individual, the expert, helps to identify the difference between present state and desired state, and allows you to find the motivation to make positive behavioral changes.

Homoeopathic Management

We know that Homoeopathic medicine is effective in treating all type of disorders. There is plenty homoeopathic medicine for treating cell phone dependence disorders also i.e. Euphrasia,

Chamomilla, Ruta, Jaborandi, Kali phosphoricum, Arsenic Album, Lycopodium clavatum, Conium maculatum, Caladium, X-ray etc.

Materials and Methods

An Observational study on 100 patients of cell phone dependence disorders was carried out in the Faculty of Homoeopathic Science at Jayoti Vidyapeeth Women's University, Jaipur and University Hospital, surrounding rural area of the University i.e. Jharna, Kot Jewar, Kesrising Pura, Dewala, Mahalan, and Bagru **from February 2017 to September 2020**, in which the patients were evaluated by using a Questionnaire (Questionnaire for Self-Assessment for Cell Phone Dependence Disorder) and evaluating the patient as a whole. Medicines were prescribed on the basis of individualization.

Medicine Used in All Cases: Euphrasia, Chamomilla, Ruta, Jaborandi, Kali Phos., Arsenic Album, Lycopodium, Conium Mac, Caladium, X-ray etc.

Total no of cases: **105**
All cases are belonged from different clinical fields.
Total number of cases improved: **63**
Total number of cases status Quo: **25**
Total number of cases which are worse: **12**
Total Drop-out cases: **05**

Total no. of cases consider for data analysis for the project: 100

- Cases are treated by Only Homoeopathic remedies & management.
- Cases of eye strain are successfully treated by Euphrasia, Ruta & Jaborandi 30, 200 & 1M (**30**CASES).
- Case sleep disturbances successfully treated by Kali phos 12X & Arsenic alb 30, 200 (**35** CASES)
- Case of infertility & male sexual dysfunction are treated by caladium, lycopodium & X-ray 200 & 1M (**20**CASES).
- Cases of OCD (Obsessive Compulsive Disorder) were also treated by Chamomilla & arsenic alb 200 (**15** CASES).

Results and Discussion

The Paired t test was used to find out the significance of the homoeopathic medicine using IBM SPSS version 25. The result showed that p value is < 0.05 & value of t (3.107) is greater than the tabulated value in t-table at df = 99 (1.9842), which was statistically significant. 63 patients improved but there was variation in the improvement. 25 patients showed no change in the manifestation and 12 patients show worsening of the symptoms. The analysis of the 100 cases showed improvement varied patient to patient. The statistical analysis shows importance and role of Homoeopathic medicine in cell phone dependence disorders.

Conclusion

The result showed that p value is < 0.05 & value of t (3.107) is greater than the tabulated value in t-table at df = 99 (1.9842), which was statistically significant, this shows that overall response of Homoeopathic medicine, for cell phone dependence disorders were encouraging with evidence of improvement in symptoms of cell phone dependence disorders, which varied from patient to patient.

The Self-assessment is necessary to check the cell phone dependence disorder to prevent it in the society. Govt. should conduct the survey and surveillance for such disorders for promotion of healthy life.

References

[1] Singh Bhatia, M. (2008). Cell Phone Dependence — a new diagnostic entity. *Delhi Psychiatry Journal,11*(2), 123-124. Retrieved November 30, 2015, from http://medind.nic.in/daa/t08/i2/daat08i2p123.pdf

[2] Mobile Technology Fact Sheet. (2013, December 27). Retrieved November 30, 2015, from http://www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/

[3] Alrehaili, A. " Assessing the Understanding and Perception of the Significance of Seasonal Immune Care among the Taif Population during the Pilgrimage Seasons: Emphasis on Influenza and Meningitis Vaccines. Journal of Medical Research and Health Sciences, 3(4) (2020), 931-940. https://doi.org/10.15520/jmrhs.v3i4.175

[4] Hassan, M. R., & Kamrujjaman, M. (2019). A Cross Sectional Study of Spinal Cord Injury-Induced Musculoskeletal Pain. Journal of Current Medical Research and Opinion, 2(12), 367-371.

a. https://doi.org/10.15520/jcmro.v2i12.234

[5] Singh Bhatia, M. (2008). Cell Phone Dependence — a new diagnostic entity. *Delhi Psychiatry Journal,11*(2), 123-124. Retrieved November 30, 2015, from http://medind.nic.in/daa/t08/i2/daat08i2p123.pdf

[6] Digital Eye Strain Report 2015. (2015). Retrieved November 30, 2015, from http://www.thevisioncouncil.org/digital-eye-strain-report-2015

[7] Hansraj, K. (2014). Assessment of Stresses in the Cervical Spine Caused by Posture and Position of the Head. (25), 277-279. Retrieved November 30, 2015, from http://www.ncbi.nlm.nih.gov/pubmed/25393825

[8] Rahman, E., Akter, M. F., Haque, M. O., & Habibur Rahman, M. (2019). Common Sports Injuries among Male Cricket Players in Bangladesh. Journal of Current Medical Research and Opinion, 2(11), 331-333. https://doi.org/10.15520/jcmro.v2i11.229

[9] Health Risks of Using Mobile Phones. (n.d.). Retrieved November 30, 2015, from http://source.southuniversity.edu/health-risks-of-using-mobile-phones-137310.aspx

[10] Tripathy, D. T., Tripathy, A., Dwivedi, D. R., Gautam, D. M., Prusty, D. U., & Nayak, D. C. PRELACTEAL FEEDING OF NEONANTS & DISCARDATION OF FIRST BREAST MILK AMONG RECENTLY DELIVERED WOMEN OF UTTAR PRADESH, INDIA. *Journal of Medical Research and Health Sciences*, *3*(5) (2020). https://doi.org/10.15520/jmrhs.v3i5.184

[11] Dangers of Texting Whilst Driving. (2008). Retrieved November 30, 2015, from http://www.trl.co.uk/case-studies/behaviour-dangers-of-texting-whilst-driving/

[12] Deepinder, F., Makker, K., & Agarwal, A. (2007). Cell phones and male infertility: Dissecting the relationship. *Reproductive BioMedicine Online,15*(3), 266-270.

Retrieved November 30, 2015, from http://www.sciencedirect.com/science/article/pii/S1472648310603380

[13] Abualhaija, D. M. "Determining the Cost of Care for U.S. Healthcare Providers: A Hybrid Approach. *Journal of Medical Research and Health Sciences*, *3*(6) (2020). https://doi.org/10.15520/jmrhs.v 3i6.216

[14] Ritchy, R. L., Olivier, R. S. R., Mikhaël, M. R., Solofonirina, R., & Nirina, R. (2019). Aspects épidémiocliniques des blocs auriculo-ventriculaires vus aux services de Cardiologie et USIC du CHU Befelatanana d'Antananarivo. Journal of Current Medical Research and Opinion, 2(10), 252–255. https://doi.org/10.15520/jcmro.v2i10.208

[15] Signs and Symptoms of Cell Phone Addiction [Internet] [Cited on- October 27, 2018] Available from: https://www.psychguides.com/behavioral-disorders/cell-phone-addiction/signs-and-symptoms/

[16] Patel, R. (2015, June 17). Cell Phone use before bedtime might impact sleep, and daytime tiredness. Retrieved November 30, 2015, from https://u.osu.edu/emotionalfitness/2015/06/17/cell-phone-use-before-bedtime-might-impact-sleep-and-daytime-tiredness/

[17] Mokbel Khalefa, K. "Ten years incidence of intracranial complications of chronic suppurative otitis media. *Journal of Medical Research and Health Sciences*, *3*(6) (2020), 996-1000. https://doi.org/ 10.15520/jmrhs.v3i6.211

[18] Bouzar, D., & Bénézech, M. (2019). Practical Guide of Assessment of Disengagement from Jihadist Violent Extremism. Journal of Current

a. https://doi.org/10.15520/jcmro.v2i10.211

[19] Babadi-Akashe, Z., & Zamani, B. (2014). The Relationship between Mental Health and Addiction to Mobile Phones among University Students of Shahrekord, Iran. *Addict Health*,*6*(3-4), 93-99.

[20] Greenfield, D. (2013). Smartphone Abuse Test. Retrieved November 30, 2015, from http://virtual-addiction.com/new-smartphone-abuse-test-now-online/

[21] Bhuiyan, M. M. " Perforation rate of appendicitis and negative appendectomies in children in Mankweng Hospital. *Journal of Medical Research and Health Sciences*, *3*(6) (2020), 991-995. https:// doi.org/10.15520/jmrhs.v3i6.205

[22] Sultana, S., Asha, N. J., Kamrujjaman, M., Akter, B., Alam, M., & Siddik, H. A. (2019). Group Therapy Perception among Parents of ASD Children Attended at SLT Unit in a Reputed Rehabilitation Centre. Journal of Current Medical Research and Opinion, 2(10). https://doi.org/10.15520/jcmro.v2i10.207

[23] Hahnemann S. Organon of Medicine. Translated from the fifth edition, with an appendix by R. E. Dudgeon, with additions and alterations as per sixth edition translated by William Boericke and introduction by James Krauss. 3rd Indian Reprint. Calcutta: Economic Homoeo Pharmacy; 2012.

[24] Boericke W. Pocket manual of Homoeopathic Materia Medica. 9th ed. Kolkata: Ghosh Homoeo Pharmacy; 2005.

European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 2, 2020

EFFICACY OF HOMOEOPATHY IN ACUTE SKIN CONDITIONS

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Abstract: Under acute skin conditions there comes various ailments of skin like Eczemas, Anaphylaxis, Atopy, Herpes Simplex, Photo-dermatitis, Seborrhoeic dermatitis, Miliaria, Chilblains, DRESS reaction, AGEP reaction, Pompholyx etc. are a spectrum of the acute skin conditions that affects human skin and manifests as erythema, eruptions, wheals, pustulosis and often present with flaking or scaling skin or wheals, inflammation and pruritus. Homeopathy is becoming one of the most popular management option for such conditions,and it is authenticated via its principles- in Ancient Indian Literature and clinical trials are needed to test the efficacy, in order to help community, Corporates and Government to create a policy to stoppage of work loss and to improve the overall quality of living of it's citizens/employees which will be observe b the end of this study and further studies will be needed for the confirmation.
Keywords: Dermatitis, Erythema, Pruritus, DRESS, AGEP, Individualization, Similimum

Materials and methods:

Inclusion criteria: Cases related to Acute Skin Conditions like Eczemas, Anaphylaxis, Atopy, Herpes Simplex, Photo-dermatitis, Seborrhoeic dermatitis, Miliaria, Chilblains, DRESS reaction, AGEP reaction, Pompholyx, Irritant Contact Dermatitis from Metals were registered and treated which presented with acuteness and severity in our OPDs.

Exclusion Criteria: Prolonged history of such skin disease, Life threatening conditions, patient on heavy allopathic medication, patient not consenting for admission/daily follow up.

Diagnostic Criteria: Case history, Lab tests done in-house laboratory esp. CBC, TEC, VEC, IgE etc.

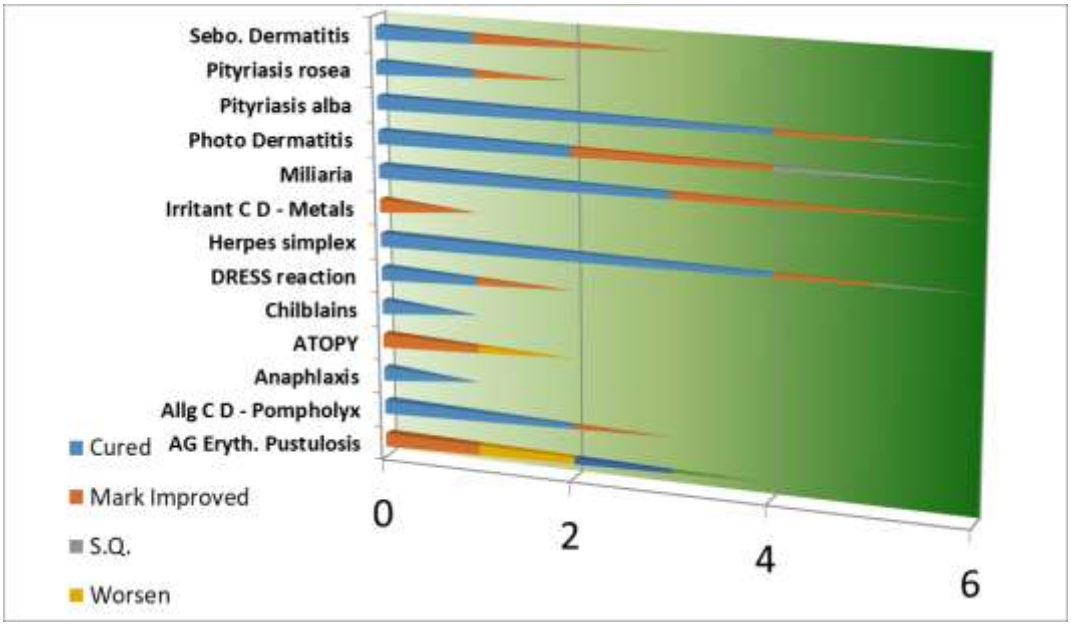
Dispensing of Medicines: From Suryaansh Arogyashala – Homeopathy Hospital at Jayoti Vidyapeeth Women's University, Mahlan, Jaipur.

Result criteria: Observations, Lab Tests and Patient Visual Analogue Scale data to be classified as Cure/Marked Improvement/ Status Quo/Worse as per response.

Results (No. of cases disease wise with max. relieving medicines): In the study 41 cases were registered from 1st Nov. 2020 to 31st January 2020 out of which no. of cases of various diagnosis and result achieved by individualized homeopathic medication were **Pityriasis alba** 3 nos (1 Cured, 2 marked improved) (Lyco. 30).,**Pityriasis Rosea** 1 no. (Cured) (Nux-V. 30);**Anaphylaxis** 1 no (Cured)(Adrenaline 30), **Atopy** 2 nos. (1 Marked Improved, 1 Worsened)(Ars.alb.30), **Herpes Simplex**4 nos. (2 Cured, 1 Marked Improved, 1 SQ)(Rhus tox.30);**Photo-dermatitis** 8 nos. (5 Cured, 3 Marked Improved) (Canth.30), **Seborrhoeic dermatitis** 2 nos.(Both Marked Improved)(Nat.mur.30), **Miliaria** 1 no. (Cured) (Bryo. 30);**Chilblains** 5 nos.(4 Cured, 1 worsened)(Agar. M. 30), **DRESS**(Drug Reaction with Eosinophilia and Systemic Symptoms) 1 no. (Marked Improved)(Sepia 30); **AGEP**(Acute Generalized Exanthematous Pustulosis)1 no.(Marked Improved) (Merc.sol.30); **Pompholyx** 1 no. (Cured) (Graph. 30); **Irritant Contact Dermatitis from Metals** 1 no. (Marked Improved) (Hep.s.30); 17 cases got cured, 12 markedly improved, 1 remained Status quo, 2 got worsened after medication and 9 cases were dropped out, out of above 41 – Data of 32 cases was considered for evaluation as per result criteria.

	Drop outs	Cured	Mark Improved	S.Q.	Worsen
AG Eryth. Pustulosis	2	**0**	**1**	0	0
Allg C D - Pompholyx	0	**1**	**0**	0	0
Anaphlaxis	0	**1**	**0**	0	0
ATOPY	1	**0**	**1**	0	1
Chilblains	0	**4**	**0**	0	1
DRESS reaction	0	**1**	**1**	0	0
Herpes simplex	0	**2**	**1**	1	0
Irritant C D - Metals	1	**0**	**1**	0	0
Miliaria	0	**1**	**0**	0	0
Photo Dermatitis	0	**5**	**3**	0	0

Pityriasis alba	2	**1**	**2**	0	0
Pityriasis rosea	1	**1**	**0**	0	0
Sebo. Dermatitis	2	**0**	**2**	0	0
Total=	9	**17**	**12**	1	2



Diagramatic representation of results in cases of Acute Skin Conditions

Discussion and Conclusion:

Ancient Indian literature:

When we study the ancient indian literature we found that the homoepathic principle of similia is also used there. In Bhagvad Puran maharshi vyas told narad muni that "*The curative drug would be the one having the capacity to produce a similar disease….*";

In Shushrut Samhita it is also been written that similar will be removed by similar one as "Samah Samam Shamayti."

Ancient Indian poet Kavi – Kalidasa in Ist Century BCsaid that manifestation of the poison can be cured by poison itself.

So homoeopathy is based on principle which was also recognized in the ancient literature. It is dynamic in nature and homeopathic is the art of system which is known for its miraculous effect without any side effects.

The study remained quite inspiring regarding use of homeopathy for acute skin conditions as it resulted in <55% cure rate having no relapses in next two months even on exposure to same conditions; <35% were marked improved showing betterment in presenting symptoms < 80%; about 3% remained Status Quo and about 6% Cases were Worsened after giving Homeopathy and were referred, 9 cases were dropped out in initial phases not consenting for further follow up due to personal reasons.

Individualization proved to be effective tool in treatment of acute skin conditions without use of suppressive topical ointments.

By above discussions it can be concluded that Homeopathy is effective way of treating acute skin conditions by the way of individualization.

The results of study has a beneficial outcome for society who faces burden of suppressive medication and common practice of using of over-the-counter topical applications for these skin conditions often leading to bad scars, chronicity of ailments and psychological ailments like anxiety, depression, embarrassment, lack of confidence in sufferers – leading to loss of work hours in private and corporate establishments, as well as in Govt. organizations.

Result of this research can give indications for making policy for treatment of such irritating and financially depraving skin conditions by Govt. and Corporates, for efficacious management of it and securing quality of life of our employees and citizens by using medicine and homoeopathic principle can also be observed in the Ancient Indian Literature. More scope of future research is for each type of acute skin condition to be carried out individually, to know there aetiological factors for practicing preventive aspect.

References: Internet Sources/Book Sources

[1] Organon of Medicine 5th Edition - www.bjainbooks.com/inr/organon-of-medicine-5-6-edition.html

[2] Zigo, F., Lakticová, K. V., & M, M. V. " THE OCCURRENCE OF BACTERIAL AGENTS CAUSING MASTITIS IN DAIRY SHEEP AND THEIR RESISTANCE TO ANTIBIOTICS. *Journal of Medical Research and Health Sciences*, *3*(7) (2020). https://doi.org/10.15520/jmrhs.v3i7.215

[3] Yu, J., Li, Y., Cao, W., Jiang, Z., Jiang, Z., & Wan, D. (2020). Regulatory Innate Lymphoid Cells: A New Subset of Innate Immune Lymphocytes with More Potential Functions to be Discovered in Immune Regulation. *Journal of Current Medical Research and Opinion*, *3*(01). https://doi.org/10.15520/jcmro.v3i01.251

[4] Mone, F. H., Roy, K., Hasan, G. Z., Roy, K., Ahamed, Q. S., & Jui, J. F. " Peutz-Jeghars' syndrome, a rare genetic disorder: A case report. *Journal of Medical Research and Health Sciences*, *3*(7) (2020).. https://doi.org/10.15520/jmrhs.v3i7.221

[5] Organon of Medicine 6th Edition - https://homeopathybooks.in/organon-of-medicine-samuel-hahnemann/

[6] Oscar Boericke's Repertory -www.homeoint.org/books4/boerirep/

[7] https://doi.org/10.15520/jcmro.v3i02.255

[8] Sushrut Samhita English translation - https://archive.org/details/englishtranslati00susruoft

[9] Kavi Kalidasa - https://soniyahomoeopathyclinic.weebly.com/profile-drbalkrishna-singh-md-homoeopath.html

[10] https://www.webmd.com/skin-problems-and-treatments/contact-dermatitis

[11] https://www.webmd.com/allergies/hives-urticaria-angioedema

[12] Wolff, K., Johnson, R. A., Suurmond, D., & Fitzpatrick, T. B. Fitzpatrick's color atlas and synopsis of clinical dermatology. 8th edition New York: McGraw-Hill Medical Pub. Division. Chicago

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European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 2, 2020

Homeopathic Clinical Drug Proving Trial on Rhodiola Rosea

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Study Description

Brief Summary:

The main aim of the study is to assess whether Rhodiola rosea in the potency C 1-4 nitites more characteristic homeopathic symptoms during proving after three days upto one week, compared to a placebo in Hypertensive and Anxiety/ Depression prone volunteers.

Secondary aims are to develop and to test a qualitative analysis methodology on which to base a definition for drug-specific (characteristic) symptoms and to compile a profile of characteristic homeopathic proving symptoms of the drug being trialed for therapeutic purposes.

This study protocol adapts the traditional homeopathic drug proving methodology to a modern clinical trial design.

Study Type :	Interventional (Clinical Trial)
Actual Enrollment :	29 participants (9 dropped out in course of proving)
Allocation:	A Randomized study
Intervention Model:	Assignment done parallely
Masking:	Quad basis (Participant, Care Provider, Investigator, Outcomes Assessor)
Official Title:	Proving Trial of Homeopathic Drug
Starting Date of Study:	8th March, 2020
Primary Completion Date :	7th July, 2020
Actual Completion Date :	25th July, 2020

Condition or disease	Intervention/treatment	Phase	Result
Subjects with HT, Anxiety/ Depression , Irritability, low immunity	Finding in literature some new drugs of vegetable kingdom which have effects on higher centres of mind capable of producing anxiety and depressive conditions leading to low energy and immunity levels	One	Found in Joseph E. Pizzorno ND, ... Herb Joiner-Bey ND, in The Clinician's Handbook of Natural Medicine (Third Edition), 2016 **Botanical medicines** - Rhodeola rosea as an medicine with antifatigue effect that increases mental performapopular plant in traditional medical systems in Eastern Europe and Asia to help combat fatigue and restore energy. *Rhodiola* hence—the ability to concentrate—and decreases cortisol response to awakening stress.
Subjects with HT, Anxiety/ Depression , Irritability, low immunity	Reviwing Literature on found herbal drug	Two -	Rhodiola (*Rhodiola rosea*) is a perennial plant that grows in the US, Canada, Europe, and parts of Asia. Its root, also known as golden root, is commonly used in Asia and Europe to treat fatigue and cognitive blunting. Its pharmacology is complex and includes a large number of active compounds, such as flavonoids, monoterpernes, phenylpropanoids, triterpenes, phenolic acids, and phenylethanol derivatives. It has multiple effects, including antioxidant, anticarcinogenic, cardioprotective, and neuroendocrine properties. Its psychopharmacological effect may include agonist properties for serotonin and dopamine and norepinephrine (perhaps secondary to monoamine oxidase inhibition), as well as influence on opioid peptides (such as beta-endorphins) and nicotinic receptors for acetylcholine. Importantly, it may also act on cellular membrane and improve the ability of serotonin and catecholamine precursors to cross the blood–brain barrier (Saratikov & Krasnov, 1987). Thus, it may be beneficial to augment treatment with

			tryptophan/5-HTP and/or phenylalanine/PEA with rhodiola. Rhodiola has been shown to have antidepressant and psycho-stimulant effects. Saratikov and Krasnov (1987) reviewed the results of a number of studies that showed that patients with asthenia (fatigue, decline in work capacity, trouble falling asleep, poor appetite, irritability, and headaches) responded favorably to rhodiola at doses of 50 mg three times per day (TID). Treatment durations ranged from 10 days to 4 months, and in studies up to 64 percent of cases exhibited significant improvement. More recently, similar results have been reported by Shevtsov *et al*. (2003) and D
Procuring drug from authentic source	 Rhodiola rosea - a perennial flowering Succulent Plant of the family Crassulaceae. Habitat: It grows naturally in wild Arctic regions of Europe (including Britain), Asia, and North America, Common name – Golden root Max.height – 16 inches Flower color – Yellow Bloom Time – May to August Temp. required - 10-25 degree C	Three	 Mystique Hills Rhodiola rosea Root Powder (Premium Quality) 50 g **Brand: Mystique Hills - Organic Living, ordered by online shopping portal – Amazon**

	Part used for medicine - roots		
Guinea pigs fed with Rhodeola rosea to be studied for nephrotoxicity /hepatotoxicity	**Rhodiola rosea 1c** dissolved in distilled water and 3gr each time mixed with 6 ml milk fed 4 times daily to animal for four days and wait and watch for next 3 days.	Four - Toxicity study on animals	None toxicity signs were observed, animal became dull from 2-3 day and more active on 5^{th} -7^{th} day, actin seems on energy levels, nerves and mental sphere
Subjects with HT, Anxiety/ Depression, Irritability	**Rhodiola rosea 1C, 2C, 3C & 4C** in sequential day to day basis for first four days, then wait and watch for next three days for primary and secondary actions to develop, tested on 20 different individuals of both sex, of various constitutions, of different socio-economic groups	Five – Clinical trial on Susceptible Human beings who are prone to Anxiety and Depression	Dullness and Over thinking with irritability, taking unfavorable decisions for others on day 2^{nd} and 3^{rd}, becoming more pliable, affectionate and balanced thinker 5^{th} – 7^{th} day

Making Homoeopathic Medicine from Rhodeola Rosea and Developing the potencies for purpose of Clinical proving by Director Faculty of Homeopathic Science Dr. M.P. Sharma, Prof. and HOD Organon – Dr. Rakesh Sharma, Prof. and HOD Repertory – Dr. Anil Kumar Vangani, Asst. Prof. Deptt. of Homeopathic Pharmacy – Dr. Pushpa Kumawat

Clinical Proving done on an individual volunteer of High socio economic group - prone to Hypertension, frequent colds ,easy fatigability, stress, hypertension, anxiety, irritability and impatience –

Mind: Wants to be alone

Irritability

Insecure about self image

Religiousness

Thirst 1.5 litres in whole day, ½ to 1 glass of water at a time

Stool –Clear

Urine – Umber colored

Ist Day: Taken Rhodeola rosea 1c; 4 grain dose morning; After 2 Hr. – Hoarseness of voice, taken ice cream after dinner, caught sore throat which got itself improved next morning

IInd Day – Taken Rhodeola rosea 2c; 4 grain dose morning; After eating a bowl of curd in breakfast - a lot of sneezing started which itself diminished in intensity till afternoon. After dinner taken ice cream today again but no pain in throat this time.

IIIrd day – Sneezings and Sore throat felt in early morning - Taken Rhodeola rosea 3c; 4 grain dose morning; - Sore throat and Sneezings got better and energy level felt better upto breakfast and Lunch. Taken Ice Cream after dinner again this night.

IV th Day – Sore throat felt in the morning, pain in throat on swallowing saliva, but with much expectoration this time. Taken $c dilution this time 10 drops in 1 ounce of luke warm water – after 1 hour - Temp. 100 Degree Farenheit, frontal headache, bodyache with pain in spots various parts of body, loss of sense of taste for food – food feeling tasteless; Slight vertiginous feeling in the evening –taken light meal – porridge and went for rest early by 8 0' clock in the evening.

Vth Day – Feverish felling, no more dosing done, loss of taste for regular food, desire more salt and sugar in food but no effect felt. Taken warm water whole day and saline gargles done 3 times a day. Porridge taken in meals. Fever upto 101 degree Farenheit on an average whole day.

VIth day – Morning waken up with weakness but no more fever, feeling intense thirst. Expectoration yellow thick which ameliorated soreness in throat, felt better by evening, but still taken porridge and warm water upto dinner on 6th day.

VIIth Day – Feeling much better in morning, energy levels a lot improved, desire to go for morning walk. Took normal tea today. More mental clarity, no more irritability and Insecure feeling. Light Breakfast taken. A little sleepy feeling in afternoon which improved after 20 mins. Nap, remained active till evening, no more pain throat or expectoration anf fever. Took usual meal in less quantity at night. No more complaints left.

Conflict of Interest: None as it is self financed project, sponsored by the university in wake of Covid-19 Pandemic to get a medicine for immune modulation of susceptible population in Urban Areas.

Conclusion: After studying effect of Rhodiola Rosea 1c – 4c, on 20 volunteers, it can be concluded that it is an excellent adaptogen, raises energy levels of individuals with capacity to think more clearly without influence of anxiety or depressive thoughts which various volunteers were already complaining of before study, also enhancing immune system for rapid recovery from Influenza like Illness which such individuals who are prone for stress and strain of modern lives often suffer from.

Scope of Future Study: More and More such studies can be carried out in the future esp. using higher potencies of Rhodeola rosea to explore psychological use of it in various psychiatric ailments.

European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 7, Issue 2, 2020

EPIDEMICS,PANDEMICS & HOMOEOPATHY

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Abstract: Homoeopathy has to play major role in future of World's health as the whole world is worst hit by pandemic of CORONA VIRUS.Homeopathic prophylactic medicines are based on the ability to prevent infective diseases & boost one's immunity when chosen according to the principle of similarity.This historicreview was the ground for evaluating the response to treatment including homeopathy in the former epidemics and also try to emphasize on future role Homoeopathy.

Keywords: Homoeopathy, Pandemic, Epidemics, CORONA VIRUS,Miasm

Introduction:A pandemic is the worldwide spread of a new disease(WHO).

Pandemics are comprehensiveoutbursts of infectious disease that can cause gravesurgein morbidity and mortality over a **widespread geographic area** and result in substantial economic, psychosocial, and political impact.

(An **epidemic** is the "unexpected"occurrenceof a disease in a **community or region**, evidently in excess of the "expected occurrence.(epi: upon, demos: people).

The Italian Word Influenza was initially used in 1743 to show the probable cause of a respiratory illness that fast affected a large number of people during the winter ("Influenza del freddo" means Influence of coldness). Greifen (German), Flu (English) and Cripu (Russian), Grippe (French) are used to entitle this severe pandemic infectious disease that erupts after irregular and relatively long periods of time.

Current data about ongoing Novel CORONAVIRUS outbreak was first documented in Wuhan, Hubei Province, China in December 2019 from where it has spreaded to almostall over the world become known as COVID19 or Novel CORONA VIRUS disease.

Risks of Pandemics

- Pandemics have happened all through history and appear to be increasing in frequency, particularly because of the increasing occurrence of viral diseases from animals.
- Pandemic risk is driven by the combined effects of triggering risk factors and spreading due to travelling across the globe.
- Influenza is always the most possiblecondition to cause a severe pandemic.

Impacts of Pandemics

- Pandemics can cause substantial, extensive increases in morbidity and mortality.
- Pandemics may cause economic impairment through multiple ways, including short-term and longer-term negative jolts to economic growth.
- Pandemics may cause psychological impact on society causing individual behavioral changes, such as fear anxiety persuadeddisliking to place of work and public gathering places.
- Pandemic easingarrangements may cause significant social and economic disruption.
- In countries with frail institutions and legacies of political uncertainty, it can increase political pressures and tensions.

CORONAVIRUSES

Coronaviruses are zoonotic viruses & are sourceof infection ranging from the common cold to severe respiratory diseases.

CORONAVIRUS is pleomorphic，RNA virus that measure 100-160 nm in diameter. The nomenclature is because of the crown like appearance produced by the club-shaped projections.

Severe acute respiratory syndrome coronavirus (SARS-CoV).

SARS - In November 2002, In South china there was outbreak of an **unusual respiratory infection** with many deaths. in February 2003, a physician from China visited HongKong, got ill and died infecting 12 persons. These twelve people then went back to their countries and beganoutbursts there.

That eventually resulted in 8096 recognized cases in 28 countries in Asia, Europe and North and South America; -90% of cases occurred in China and Hong Kong.

Natural reservoirof SARS-Co V is thought to be the **horseshoe bat.**

Infection can be transmitted from human to human. **Case-fatality rate is 9.5%. SPREAD through small and large droplets.**

Middle East respiratory syndrome coronavirus (MERS-Co V)

MERS: It was first identified in SaudiArabia in 2012. It has been linked with a coronavirus (MERS-CoV). Through May 2014， a total of 536 cases and 145 deaths

(27%) have been reported.

PREVALENCE– winterand early spring-times.

Mode of Transmission: one person to others via droplets produced from the respiratory system of infected people, during coughing or sneezing,touch.

CORONAVIRUS are sensitive to heat, lipid solvents, formaldehyde,oxidizing agents & non-ionic detergents.

CLINICAL MANIFESTATIONS -

- Incubation period: generally, lasts 2-7 days (ranges from 1-14 days)
- It starts as a systemic illness marked by onset of fever， accompanied by malaise， headache， and myalgias.
- Followed in 1-2 days by a nonproductive cough, pneumonia and dyspnea.
- Approximately 25% of patients may have diarrhea
- In severe cases, respiratory function may deteriorate during the second week of illness and progress to frank adult respiratory distress syndrome accompanied by multiple organs dysfunction& death.

chest x-ray shows infiltrates, patchy areas of consolidation-most frequently in peripheral and lower lung fields, or interstitial infiltrates.

- **Risk factors:** age more than 50 years, co-morbidities such as cardiovascular disease， diabetes and hepatitis,immunocompromised health conditions.

LABORATORY FINDINGS AND DIAGNOSIS -

- Lymphopenia,mostly affects CD4+ T cells, also comprises CD8+ T cells and natural killer cells.
- Thrombocytopenia may advance as the illness grows.
- Biochemical analysis: Raised serum levels of creatine kinaseaminotransferases and lactate dehydrogenase.
- **Rapid diagnosis by reverse transcription Polymerase Chain Reaction (RT-PCR) of respiratory tract samples and plasma early and urine and stool later.**

Basics of homeopathic prophylaxis --Homoeopathy isat all times boon to the patients in epidemics and pandemics crisis.
During an epidemics of scarlet fever in Königslütter, Germany in 1801, preventive use of

homeopathy was first applied, when Samuel Hahnemann, the forefather of Homoeopathy, approved single dose of Belladonna, as the Genus epidemicus to vulnerable children. Eizayaga sustains that nosodes increase specific immunity regarding certain causative agents &homeopathic medicines increase individual general resistance to infections.

PLACE	YEAR	DISEASE	MORTALITY RATE CONVENTIONAL MEDICINE	MORTALITY RATE HOMOEOPATHY
Konigslutter,Germany	1799	*scarlet fever*		<5%
Russia	1830 ~ 1831	*Cholera*	63%	*11%*
Vienna	1830 ~ 32	*Cholera*	31%	7%
Ireland	1847	*Typhus fever*	13%	2%
England	1847	*Typhus fever*	13%	2%
Edinburgh,Scottland	1848	*Cholera*	68%	24%
Austria	mid 1840 and 41	- *Pneumonia*	20%	5%
South of America	1853~1855	*Yellow fever*		5.4%
London, England	1854	*Cholera*	59.2 %	16.4%
New Orleans, USA	1878	*Yellow fever*	17%	5.6%
Pittsburgh, USA	1918	*Spanish Influenza*	30%	1.05%

As per Finlay Institute, near 90% of Cuban population received ***homoeopathic preventive medicine (Homoeoprophylaxis)*** for respiratory diseases, influenza between December 2009 and January 2010 with notable outcomes and low mortality rate.

Hahnemann describes about epidemics in Aphorism101,102,103 in 6th Edition of Organon of Medicine.

CAUSE OF DISEASE IN HOMOEOPATHY

THE EXCITING CAUSE : Excesses or inadequate food, chills, over-heatings, dissipation, strains, etc., or physical irritations, emotions etc. They are only a momentary explosion of latent psora, which naturally returns to its dormant state if the acute diseases are not of so violent.

Or they attack numerous persons at the same time --SPORADIC DISEASES.The susceptibility for being morbidly affected by harmful agent is possessed by few individuals at one time. those diseases where many individuals are affected by very similar sufferings from the same cause (EPIDEMICS) ; these diseases usually become infectious (CONTAGIOUS) when they prevail, among thickly gatheredpopulation,because the cases of disease have an same origin, they set up in all those affected by an identical morbid process, which when left as it isendswithin a moderate period of time in death or recovery.

ACUTE MIASMS which recur in the same manner which either attack persons but once in a lifetime, as the small-pox, measles, whooping-cough or those recur frequently in same mode, the plague of the Levant, the yellow fever of the sea-coast, the Asiatic cholera, etc.

Three means of prophylaxis in Homoeopathy

1)The constitutional medicines

The constitutional medicines based on the totality of symptoms tend to reduce susceptibility toward infectious disorders. These medicines strengthen the vital force, eliminate predispositions to infection,increasesoverall immunity&increase vitality.Combined with better hygiene, nutrition and stress management plans, constitutional treatment forms the original line of defense to counter various forms of infectious disease.“No disease can rise without an prevailing predisposition to that disease. Constitutional treatment does not only offer resistance to infectious diseasesbut also prevent predispositions toward the diseases from growing into fully developed organic diseases in future life.

2) The Genus epidemicus

Hahnemann himself had already laid down the foundation for successful treatments of epidemic diseases.

How to find Genus Epidemicus--

1)Take a good number of cases and collect their symptoms.

2) Take all disease specific symptoms.

3) Exclude all patient specific symptoms.

4) Select one or more medicines based on the disease totality.

The medicines based on this totality is called as the ‘Genus Epidemicus’.

Better personal & surrounding hygiene and proper diet& avoidance of overcrowding combined with the genus epidemicus helps to achieve th goal of cure.

3)The use of nosodes.

Nosode of the aggressivemiasm is known to prevent the same disease. For e.g.Pertussin to prevent whooping cough. Hahnemann made it very clear that specific prophylaxis should only be used when there is truly a clear and present danger of infection. In this way general protection provided by good constitutional treatment can be complemented by a specific prophylaxis.Use of Variolinumfor smallpox epidemics in USA.

Discussion: Increasing resistance to antibiotic and antiseptic treatmentis beingstated worldwide. It look like that old miasms are returning while existingmiasms are rapidly changing into more hazardous forms. New miasmsmay be carried by animal hosts are crossing species lines and infections are spreading to new areas. Suppression of the infectious miasms by unsuitable medicines is rising the virulence of microorganisms and their resistance to treatment. The orthodox school may find itself incompetentwith ever-increasing epidemic disorders. It is crucialfor the homoeopaths to understand how to prevent, terminate and treat epidemic diseases.

Conclusions

Hahnemann's continuous study about the miasmic diseases and theorized that the suppression ofmiasms will lead to new virulent strains, more difficult forms of social diseases and new complex chronic ailments. He suggested that the inner miasms will continue to transform into deeper chronic degenerative states, which includes autoimmune diseases and immunodeficiency disorders that are incurable by orthodox medicine. His estimate that the worldwide suppression of infectious disease will lead to more virulent infections and more complex chronic states has come true. The abuse of antibiotics and antiviral agents has increased resistance and helped to create increased susceptibility to new virulent stains of microorganisms..Further research needed to be done to expandIndividualizedtherapeutic homoeopathicapproach which canadd efficacy, efficiencyand safetyfor themedicinal management of such virulent conditions &an epidemic insociety withboth preventive and healing actions, with minimum side-effects and at a low cost.

References:

[1] The Principles & Practice of Homoeopathy by Richard Hughes --- Diseases of respiratory organs,Pg.524,553.
[2] Harrison's Principles of Internal Medicine 19th edition, Section 13, Infections due to DNA & RNA Respiratory Viruses,Pg.1203.
[3] Marcus, M., & Tomasi, D. " Emotional and Cognitive Responses to Academic Performance and Grade Anxiety. Journal of Medical Research and Health Sciences, 3(4) (2020), 919-925. https://doi.org/10.15520/jmrhs.v3i4.172
[4] Shrivastav, M., Kharkwal, N., Tiwari, A., & Gupta, K. K. (2020). A Cross Sectional Study of Type 2 Diabetes Mellitus Comparing Different Factors between Lean Body Weight, Non Obese and Obese Patients in Western Uttar Pradesh. *Journal of Current Medical Research and Opinion*, *3*(01), 405-409. https://doi.org/10.15520/jcmro.v3i01.248
[5] Dr Hahnemann,Apho.101,102,103,Organon of Medicine,6th edition.
[6] Simillimum.com,The Prevention of Epidemic Diseases by Homoeopathy,Part One : The Origin of Homeoprophylaxis,byDavid Little
[7] Albrethen, I. A., Alshehri, T. M., albraithen, K. A., Alenezi, abdullah I., Alkahtani, H.

M., & Albalawi, A. Y. (2020). Update of Hyperbaric Oxygen Therapy in the Management of Chronic Wound. *Journal of Current Medical Research and Opinion*, *3*(02), 422-425. https://doi.org/10.15520/jcmro.v3i02.255

[8] Wholistic Healing Publications, Volume 9, No. 2, HEALING HUMANITY WITH HOMEOPATHY: Homeopathy for Epidemics, Collective Trauma and Endemic Diseases, Harry van der Zee, MD

[9] Homeopathy and Public Health, Homeopathic Prevention and Management of Epidemic Diseases Jennifer Jacobs, Homeopathy 2018;107:157–160

[10] Makhubele, H. D., & Bhuiyan, M. M. (2020). Primary Non-Hodgkin's Lymphoma of the bilateral Breast and review the literature. *Journal of Medical Research and Health Sciences*, *3*(4), 926-930. https://doi.org/10.15520/jmrhs.v3i4.173

[11] Alakeel, A. (2020). Safety and Efficacy of Imiquimod in the Treatment of Infantile Hemangioma; a Systematic Review and Meta-Analysis. *Journal of Current Medical Research and Opinion*, *3*(03), 430–438. https://doi.org/10.15520/jcmro.v3i03.270

[12] Winston J. The Faces of Homeopathy. Wellington, New Zealand: Great Auk Publishing; 1999

[13] Finsterer, J. (2018). The m.1555A>G variant not only manifests with hypoacusis but with multisystem mitochondrial disease. *Journal of Medical Research and Health Sciences*, *1*(4). https://doi.org/10.15520/jmrhs.v2i4.11

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No. 05, May 2019 ISSN No.- 9726-001X

ROLE OF SWAMI VIVEKANAND IN EDUCATION IN INDIA

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Abstract- Swami Vivekanand is not only religious reformer but also a leader of nationalism, education reformer. When vivekanand spread the culture of India worldwide than the education system destroyed by britishers. Vivekanand give the philosophy along with education of religion, nationalism and Vedanta. In this paper, pointed out the role of vivekanand in education with analysis of researches.
Keywords: Nationalism, Powerful weapon, Teaching-learning process, Moral values.

1 INTRODUCTION

On January 12, India celebrates National Youth Day and that is how India pays tribute to the great patriot prophet of India Swami Vivekananda on his birth anniversary. He was born as Narendranath Datta on January 12, 1863 at Calcutta. And today is Swami Vivekananda's 154th birth anniversary. He was not only a social reformer but also an educator. His contribution to educational thought is of supreme importance of education is observed as the most powerful instrument of social change.

2 ROLE OF VIVEKANAND IN EDUCATION

The Humanism of Vivekananda is essentially spiritualistic, intensely human, necessarily universal, and integral. It is a spontaneous out-flows of his own deep-rooted inner realization of the spiritual unity and totality of all existence and knowledge and the synthetic and synoptic vision of the Vedantic spiritual tradition.

Vivekananda was not a cold theoretician but a warmhearted prophet. In him, all the faculties of head, heart and mind were balanced in a harmony of power and perfection. Vivekananda's universality is rooted in his own realization of the spiritual oneness of existence. Unity was the background of his philosophical learning. He held man-making as his central task, because if the manhood of man was not awakened, whatever else was done for man was of no use at all. Vivekananda's humanism aims at the fullest development of man, both at the personal and social levels. In fact, religion, from his practical point of view, is a mouthpiece of humanism and should always be directed towards the goodness of mankind. For him, religion is realization; the realization of the divinity in each and all. Vivekananda found education as the most effective tool for man- making. In his teaching on man making,Vivekananda laid great emphasis on character building. Another most significant aspect of humanism to which he gave utmost importance is love. Freedom, which is one of the most important concepts of humanism, occupies a central place in Vivekananda's thought.

Vivekananda's educational philosophy is more social rather than individualistic and aims at an overall development of society. According to Swamiji, each individual is divine by nature; the aim of education should be the manifestation of the inherent divine nature of man. The educational philosophy of Vivekananda has its roots in the ancient Indian scriptures like Vedanta. He strongly advocates an educational system based on modern technologies to suit Indian Spiritual ideas. Swamiji was a practical Vedantin in every aspect of life and his educational ideas have therefore touched all realms of India's social and economic life. His idea on education can be taken as a guideline for a complete reconstruction of the present system of education.

According to Vivekananda, spiritual revival implies a reawakening of

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No. 05, May 2019 ISSN No.- 9726-001X

the mind and inner being of man. The crisis facing humanity today is due to materialism wrongfully converted into an end in itself. This crisis can only be overcome by a restoration of spiritual values. According to Vivekananda self-realization is an inevitable essentiality for the freedom and rhythm of the mind to attain harmony for peace and love of mankind on earth. According to Radhakrishnan the values are as real as the facts, but it is their nature to be hierarchical. Radhakrishnan emerges as a champion of moral values. He is all for a recovery of faith. His philosophy is one of hope and courage that humanity moves into a new era for a better, healthier as safe future. Values are socially shared ideas, about what is right. One of the most important means to achieve this end is value orientation of education. This will help human beings to conduct themselves in the more desirable direction and to shape their life patterns by strengthening their beliefs and by integrating facts, ideas, attitudes and actions. This will also help them to clarify their aims in life as well as the processes to achieve the same.

The philosophy of Vivekananda is neo-Vedanta. It is Vedanta explained in modern rationalistic and scientific terms. Basing his philosophy on the principles of Advaita of Sankara, Vivekananda interpreted them for the practical needs of man and society. His ethical theory is based on 'Self-abnegation', the limit of liberation. For Vivekananda, humanism is the dominant note in philosophy and religion. The religion is expressed in service to humanity, universal brotherhood and humanism.

According to Swamiji, the transformation and salvation of selves is possible only in a divinized society. Swami Vivekananda explained that religions of the world were not contradictory but they were complementary to one another. He realized that the main cause of the present degeneration of Indians is the lack of faith in them. He also points out that the evils which exist in this world are not fully objective but subjective. According to Swami Vivekananda education should cover all aspects of life - material, physical, moral, intellectual, spiritual and emotional, as education is a constant process. For him, education defines as the manifestation of perfection that is already in man.

He suggested that education should aim at reforming the human mind; it should not be for filling some facts into the brain. Education should be the preparation of life. He once said that Education is not the amount of information that is put into your brain and runs riot there, undigested all your life. We must have life-building, man-making, character-making, assimilation of ideas. If you have assimilated five ideas and made them your life and character, you have more education than any man who has got by heart a whole library. If education were identical with information, the libraries would be the greatest sages in the world and encyclopedias the rishis. Vivekananda propagated that the essence of Hinduism was best expressed in Adi Shankara's Advaita Vedanta philosophy. And thus, for modern education system Swami Vivekananda wanted to implement maximum emphasis on meditation and concentration in the teaching-learning process.In the practice of general education, as it is in the practice of yoga, five fundamentals have necessarily involved- the aim, the method, the subject, the taught and the teacher. He convinced of the fact that by practicing meditation and concentration, all knowledge in the human mind can also be practiced.

By giving re-orientation to education, politics, economics and sociology, Swami Vivekananda wanted to remove the evils of the society. For this change, he laid stress on education as a powerful weapon.

(Hussain. 1973) **Swami Vivekananda's Philosophy of Education - A Psychometo physical Approach**. Hussain made a study on Swami Vivekananda's philosophy of Education. The major objective of his study was demonstrating Vivekananda's Philosophy of education. He found that Vivekananda's educational schemes were firmly rooted in Vedanta and were sound from the standpoint of modern educational psychology and that they were relevant to the crisis in the Indian Education in the 70's. Different aspects of

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No. 05, May 2019 ISSN No.- 9726-001X

human development as contained in the thought of Vedanta have been examined, exposed and compared with the concepts of individual development occurring in the modern educational psychology. It has been clarified that Vedanta lays emphasis upon the education of the 'whole man' widely and equally believing in physical, intellectual and spiritual education.

Attempts were made to indicate how the implementation of Vedantic thoughts have been carried by Vivekananda into his educational proposals and the following are some of the conclusions reached-

1. Vedantic concept of education might offer a solution to the crisis of the Indian Education in the 70's.
2. What the child gets in the name of education in the purely academic atmosphere in our schools is an incomplete view of life, which does not enable him to face boldly and completely every problem of his life in the competitive society
3. Education in the Vedantic sense promoted the unity of mankind at both the national and international levels
4. Education system for its proper functioning demanded responsibility equally from the teachers, students and guardians and it must be discharged in the best interests of the country
5. Teachers and administrators were not enthusiastic enough to execute in the class room the psychological methods of teaching as suggested by experts. According to Hussain, large scale callousness prevailed in the realm of education, which was badly damaging the entire educational structure.

3 CONCLUSION

1. Education was defined as physical health, the training of the intellect and spiritual training for the youth and religion was established as related to other interests, source and morality.
2. 2 Democracy was identified as the best form of Government implying freedom which was inseparable from responsibility the sources of which were morality philosophy, law and the like. However, religion was the lasting source of freedom and responsibility on which were dependent the programmes for democratic education.
3. The foundations of Vivekananda's new Vedanta were the scriptures and their interpretations.
4. He believed that the child learnt through self education and things were made clearer by his own power of perceptions and thoughts. The teacher should be a helper and a guide.
5. Vivekananda stressed the need for religion without any dogmas.
6. Vivekananda believed in the universal brotherhood of men, in the uplift of mankind.

REFERENCES

1. Das,Soman. (1964).The Basis of Social Actions According to Vivekananda as Compared with Christian basis. Unpublished B.D. thesis, Serampore: Serampor College.
2. Divakar, S.M. (1969). A Critical Study of the Educational Philosophy of Upanishads (Edn.). Doctoral thesis. Baroda: M.S. University
3. Hussain, M. (1973). Swami Vivekananda's Philosophy of Education – A Psychometa Physical Approach (Edn). Doctoral Thesis, Calcutta University.
4. Avinashilingam, T.S. (1974). Educational Philosophy of Swami Vivekananda. Coimbatore: Sri Ramakrishna Mission Vidyalaya.
5. Puthiyath, (1978) The Educational Philosophy of Swami Vivekananda. Coimbatore: Sri Ramakrishna Mission Vidyalaya.
6. Dutta, (1978) Study of the philosophy of Vivekananda with Reference to Advaita Vedanta and Great Universal Heart of Buddha. Coimbatore: Sri Ramakrishna Mission Vidyalaya.
7. Kunjamma, Rajeswari (1979). Swami Vivekananda's Letters A Study. Ph.D. Thesis, University of Kerala.
8. Nair, V. (1980). Educational Ideas of Swami Vivekananda (Edn). Doctoral Thesis, University of Delhi.
9. Bhake, (1983) A comparative study of the educational philosophy of Tilak and Swami Vivekananda, Doctoral Thesis, University of Delhi.
10. Rema, M. (1983). Educational Contributions of Swami Vivekananda. Med Dissertation, University of Calicut.

Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No. 05, May 2019 ISSN No.- 9726-001X

11. Gupta, (1985) A study of Educational thoughts of Swami Vivekananda, Doctoral Thesis, University of Delhi.

EFFECT OF INDIVIDUAL SPORT VERSUS TEAM SPORT ON QUALITY OF LIFE, FUNCTIONAL INDEPENDENCE AND PSYCHOLOGICAL WELL-BEING IN PARAPLEGICS: A COMPARATIVE STUDY

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Abstract

Background and aim: Spinal cord injury along with the motor and sensory impairments results in psychological and functional problems. Recent studies have shown that participation in wheelchair sports improves functional psychological well-being and life satisfaction. The aim of this study was to assess and compare the effects of individual versus team sport on quality of life, functional independence and psychological well-being.

Methods: 40 paraplegics (age between 17-47 years) were participated in individual sport (n=20) and team sport (n=20) on alternate days for 6 weeks (21 sessions). Quality of life, functional independence and psychological well being were measured with RAND 36, SCIM and PHQ-9 respectively, pre intervention and post intervention. A comparison between the scores was done after intervention.

Results: In quality of life (QOL) individual sport induced significant improvements in three parameters, physical functioning, bodily pain and general health and in team sport significant improvement was seen in all eight domains ($p<0.05$) of RAND 36. Significant improvement was there in team sport in all three parameters of SCIM and highly significant improvement was noticed in both the sports (basketball and table-tennis) in the scores PHQ-9.

Conclusion: Team sport (basketball) is highly effective than individual sport (table-tennis) for improving quality of life, functional independence and psychological well-being in paraplegics.

Keywords: Paraplegia; team sport; individual sport; Quality of life; functional independence; psychological well-being.

Introduction - Life expectancy for individuals after spinal cord injury (SCI) is approaching that of the able- bodied population, the ultimate goal of rehabilitation for this group has shifted from extension of life expectancy to enhancement of independence and quality of life [(8).] The importance of regular physical activity on the course and success of rehabilitation after SCI has been increasingly recognized, especially with respect to the physical benefits of exercise for promoting functional independence and psychological well-being The sportive practice in the hospitalization condition, in turn, complements the medical and physiotherapeutic care, reduces the hospitalization time, increases the independence degree and the initiative capacity, and contributes for the education and the adoption of behavioral procedures in order to assure the continuity of the process aimed at the physical and mental health and social welfare [(16)]

Sports can play an important role in people with disabilities. They not only are benefited physically by participating in sport activities, but also psychologically and socially. Their quality of life improves and they are more likely to integrate into the community. Although sports also have some disadvantages such as the risk of injuries and concerns unique to the people with disabilities, these should not stop them from participating [(9).] Muraki (2000) and colleagues compared a group of wheelchair basketball players with a group of varsity college players and a control group of college men. The participants who used wheelchairs were found to have significantly better mental health profiles than the two comparison groups.

Nemunaitis et al (2003) compared 19 individuals with SCI on a wheelchair basketball team to 38 individuals with SCI who were not members of a team. They concluded that membership in a wheelchair basketball team was correlated with improved community integration, based on increased Community Integration Questionnaire (CIQ) productivity subscale scores among the wheelchair basketball team members. However, Foreman et al, failed to show any significant difference of psychological measurements between sports participants and non- participants with spinal cord injury. Thus, there has been a notable discrepancy of psychological benefits among previous studies.

Sonja A. McVeigh *et al*., (2009) studied on influence of sport participation on community integration and quality of life. Author reported that the CIQ and QOL scores were higher among sport participants compared to non-sport participants. Elizabeth Campbell (1994) examined (a) the psychological well-being of wheelchair sport participants and wheelchair sport non participants, and (b) the influence of competitive level on the psychological well-being of wheelchair sport participants. Psychological well-being was evaluated by considering mood, trait anxiety, self-esteem, mastery, and individual self-perceptions of health and well-being. Author reported that wheelchair sport participants exhibited an iceberg profile of positive well-being with lower tension, depression, anger, and confusion and higher vigor than the sport nonparticipant group sport participants group

showed significantly greater levels of mastery and more positive perceptions of their health and well-being than the sport nonparticipant group. International athletes had (a) higher levels of vigor than the national and recreational groups; (b) lower levels of anxiety than the regional and recreational groups; (c) higher levels of self-esteem than the national, regional, and recreational groups; (d) higher levels of mastery than the regional and recreational groups; and (e) more positive perceptions of their well-being than the national, regional, and recreational groups.

For many decades, social scientists have been interested in the potential psychological wellbeing benefits that result from group memberships and identification with others [(3)]. Wann (2006) recently developed the Team Identification–Social Psychology Health Model to account for the positive relationships between sport team identification and well-being. According to this framework, team identification leads to well-being benefits because it results in increased social connections with others.

Theorists and practitioners believe that participation in team sports contributes to the development of team behavior in the workplace because they require a similar work ethic, sense of loyalty and responsibility, and development of goal setting skills [(12)]. *Garlick, D G,(*2002) studied on psychosocial effects on women playing a team sport compared with women playing non-team sports and found better stress management and better body image indicating useful effects of team sport as compared with non-team sports for women. Jessica R. Eagleton *et al.,* (2007) studied on extraversion and neuroticism in team sport participants, individual sport participants, and nonparticipants and found that team participants scored higher on extraversion than both individual sport participants and nonparticipants.

Sports participation is an indispensable method of modern rehabilitation. Especially after medical rehabilitation is completed, sports have an invaluable therapeutic value in renewing the spinal cord injury patient's lost powers, helping coordination, and maintaining stamina. Today, individuals with paraplegia participate in all types of sports for competition, enjoyment, and to improve overall fitness. [(22)]

Many sports are available for the wheelchair user, including: archery, basketball, bowling, cycling, football, flying, golf, horse riding, motorcycling, power lifting, quad rugby, road racing, scuba diving, shooting, skiing, softball, swimming, table tennis, tennis, triathlon and water skiing[(15).]

Earlier researches have been conducted to analyze the effects of sports in improving the functional independence, psychological well-being and quality of life in SCI population. To date, no study has been done that determine the effects of team and individual sport on quality of life, functional independence and psychological well-being in paraplegics. The present study would be an addendum to them, as it analysis the effect of individual and team sport in paraplegics. Henceforth, such experimentation may provide a new paradigm to understand the major factors governing functional independence, psychological well-being and QOL in paraplegics.

Methods

Participants and Recruitment

A sample of 40 SCI patients who met the inclusion criteria (Paraplegics with level of injury of T5 – L4 [(10)], age 17-47 years, able to propel the active wheelchair, post one year injury, subject must not participate or involved in any kind of game or sport after injury) through the physical assessment were included in this study. Patients were excluded with any other uncontrolled neurological (except SCI), cardiac, musculoskeletal or psychiatric impairment and with complications such as pressure sores, autonomic dysreflexia, urinary tract infection, orthostatic hypotension and heterotrophic ossification [(11)]. 40 patients were divided in two groups (individual and team sport), each group comprised of 20 subjects. The subjects were explained about the study. An informed consent was taken.

Procedure

Subjects were the divided into two groups (basketball and table-tennis). Before the intervention RAND 36, SCIM and PHQ-9 questionnaire were administered to both the groups. First group participated in individual sport (table tennis). The subjects were told to void before participating in the session. Braces were allowed to wear while playing. Warm up exercises and stretching exercises were done for 10 minutes. Safety straps were used by participants for safety measures. Table-tennis was played between two subjects at a time. Tables-tennis was played for 30 min. Cool down exercises (2 rounds of basketball court and stretching exercises) were done for 10 minutes after the sport.

Second group participated in team sport (basketball). Like in individual sport, subjects were told to void before participating in the session. Braces were allowed to wear while playing. Warm up exercises (2 rounds of basketball court and stretching exercises) were done for 10 minutes. Safety straps were used by participants at leg and abdomen levels. 10 participants were divided into 2 groups (5 participants each team). Wheelchair basketball was played by two teams of five players each. The aim of each team was to score in the opponent's basket and to prevent the other team from scoring. Basketball was played for 30 min. Cool down exercises were done for 10 minutes after the sport.

Frequency of sport participation was playing the sport in alternate days that was more than 3 times per week[(17)] Post- test questionnaire were administered after six weeks. Quality of life, functional independence and psychological behavior were measured by RAND 36, SCIM and PHQ-9 respectively. Total scores were then calculated for each individual to allow comparison between the two groups.

Data analysis: The age of two independent groups (Group A: individual sport, Group B: team sport) were compared by independent Student's t test while sex proportion were compared by Fisher's exact test. The pre and post outcome measures (Quality of life, Functional independence and Physical well being) of two independent groups were compared by repeated measures analysis of variance (ANOVA) using general linear models (GLM) and the significance of mean difference within and between the groups was done by Newman-Keuls post hoc test. A two-tailed (α=2) probability $p<0.05$ was considered statistically significant. All analyses were performed on SPSS (version 15.0).

Results: The proportions of males and females found no significant difference between the two groups (15/5 vs. 18/2, p=0.4075) also the mean age of two groups was not significant (29.35 ± 8.65 vs. 30.95 ± 7.42, p=0.5337).

In RAND 36, group A (table-tennis) showed significant improvements in three parameters- physical functioning, bodily pain and general health of the patient (Table 1 and Fig. 1a). Group B (basketball) showed significant improvement in all the eight parameters of RAND 36 (Table 1 and Fig 1b). There was significant difference in team sport v/s individual sport (Table 1 and Fig. 1c) in four parameters of RAND 36 - Vitality (62.00 ± 18.02 vs. 76.00 ± 20.04, p=0.0140), social functioning (65.63±13.98 vs. 76.88 ± 10.94, p=0.0103), bodily pain (70.50 ± 14.90 vs. 82.50 ± 14.80, p=0.0111), and general health (66.50 ± 16.63 vs. 77.20 ± 11.90, p=0.0249).

In SCIM, group A (Table 2 and Fig. 2a) showed non-significant improvements in all three parameters but Group B (Table 2 and Fig. 2b) showed significant improvement in all three parameters. There was significant difference in team sport v/s individual sport (Table 2 and Fig. 2c) in all parameters of SCIM- self-care (4.65 ± 0.29 vs. 4.89 ± 0.32, p=0.0212), respiration and sphincter management (6.75 ± 1.12 vs. 7.50 ± 0.98, p=0.0336) and mobility (2.21 ± 0.32 vs. 2.52 ± 0.28, p=0.0050)

In PHQ-9, both group A (Table 3 and Fig 3a) and group B (Table 3 and Fig 3b) showed significant difference in improving depression levels of the participants. There was significant difference in team sport v/s individual sport in improving depression levels (Table 3 and Fig 3c). in other words both table-tennis (0.53 ± 0.23 vs. 0.35 ± 0.16, p=0.0010) and basketball (0.52 ± 0.26 vs. 0.18 ± 0.14, p=0.0022) improves depression levels of paraplegics.

Discussion: For the present study, we divided our sample populations into two groups (group A and Group B). 20 patients were taken in each group where the proportions of males and females found no significant difference between the two groups (15/5 vs. 18/2, p=0.4075). also the mean age of two groups was not significant (29.35 ± 8.65 vs. 30.95 ± 7.42, p=0.5337).

In the study, the statistical observation reveals the pre and post sport RAND 36 of two groups. There was improvement in all the parameters of RAND 36 for both the groups. In group A, there was a noteworthy improvement in all the calculated parameters of RAND 36. However there were significant improvements in the response values for physical functioning, bodily pain and general health of the patients. This finding can be correlated with a study done by Hick *et al.,* (2003) who also found that physical activity led to less pain in patients with SCI. It is seen that sports activities give more leisure and patient shows more interest and perceived less pain than any other activities.

Semerjain (2005), concluded that exercise program of twice weekly for 10 weeks (20 sessions) can significantly increase the health and functioning of SCI patients. In this study, all participants (N=12), reported significant improvements in their health and physical activity that they attributed to exercise. In our study, there was improvement in general health and physical functioning after 6 weeks (21 sessions) of participation.

In Group B, there was a significant improvement in all the eight domains of RAND 36 which revealed that team sport is much effective than individual sport in improving overall QOL. There was substantial improvement in team sport, with 4.5 fold change in VT, 3.0 fold change in SF, 2.8 fold change in BP, 2.6 fold change in GH, 2.1 fold change in MH, 1.7 fold change in RE, 1.5 fold change in RP and 1.4 change in PF.

Positive health status and superior community participation were found in highly physical activity group compared with low or inactive groups of people with mobility and limitations (Angela Crawford *et al*, 2008). There was also improvement in all the eight domains of RAND 36, who were involved in high physical activity. In our study, high frequency of sport activity performed by all participants (≥ 3 times/week) and improvement was seen in all eight domains of RAND36 who were involved in team sport.

Table 1: Pre and post QOL parameters summary (Mean ± SD, n=20) of two groups

Parameters	Groups	Pre sport	Post sport	p value	% mean change	Fold change (Group B/Group A)
PF	Group A	20.15 ± 12.67	27.55 ± 13.96	0.0189	36.7%	
	Group B	20.80 ± 12.26	31.75 ± 17.27	0.0005	52.6%	1.4
	p value	0.8854	0.3534	-	-	-
RP	Group A	17.50 ± 16.42	26.25 ± 23.61	0.1074	50.0%	
	Group B	18.75 ± 19.66	32.50 ± 11.75	0.0064	73.3%	1.5
	p value	0.8306	0.2866	-	-	-
RE	Group A	78.33 ± 29.17	91.67 ± 18.33	0.0638	17.0%	
	Group B	73.33 ± 33.51	95.00 ± 16.32	0.0182	29.5%	1.7
	p value	0.5354	0.6796	-	-	-
VT	Group A	58.50 ± 15.65	62.00 ± 18.02	0.7687	6.0%	
	Group B	59.75 ± 16.18	76.00 ± 20.04	0.0073	27.2%	4.5
	p value	0.8226	0.0140	-	-	-
MH	Group A	63.40 ± 13.12	69.40 ± 13.93	0.3228	9.5%	
	Group B	64.05 ± 15.18	77.00 ± 17.74	0.0089	20.2%	2.1
	p value	0.8922	0.1159	-	-	
SF	Group A	59.38 ± 14.55	65.63 ± 13.98	0.1107	10.5%	
	Group B	58.43 ± 14.16	76.88 ± 10.94	0.0003	31.6%	3.0
	p value	0.8244	0.0103	-	-	-
BP	Group A	63.36 ± 14.04	70.50 ± 14.90	0.0033	11.3%	
	Group B	62.55 ± 13.59	82.50 ± 14.80	0.0002	31.9%	2.8
	p value	0.8600	0.0111	-	-	-
GH	Group A	59.50 ± 15.30	66.50 ± 16.63	0.0899	11.8%	
	Group B	59.25 ± 14.80	77.20 ± 11.90	0.0005	30.3%	2.6
	p value	0.9575	0.0249	-	-	-

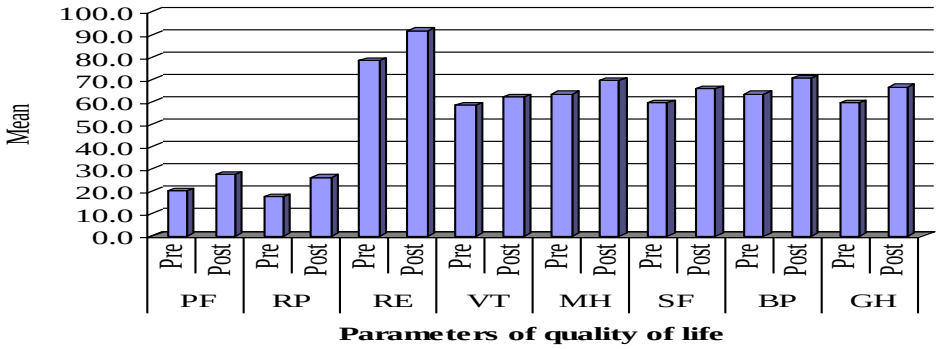

Fig. 1a. Bar graphs shows pre and post mean (± SD) QOL parameter scores of Group A (Individual sport).

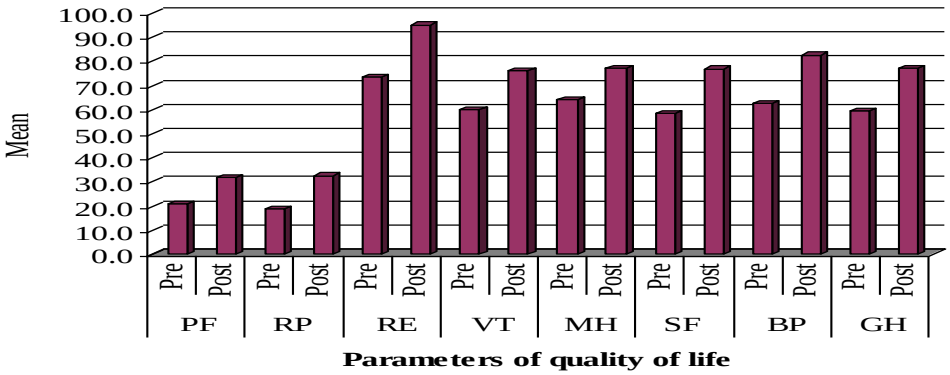

Fig. 1b. Bar graphs shows pre and post mean (± SD) QOL parameter scores of Group B (Team sport).

ISSN: 2249-6661
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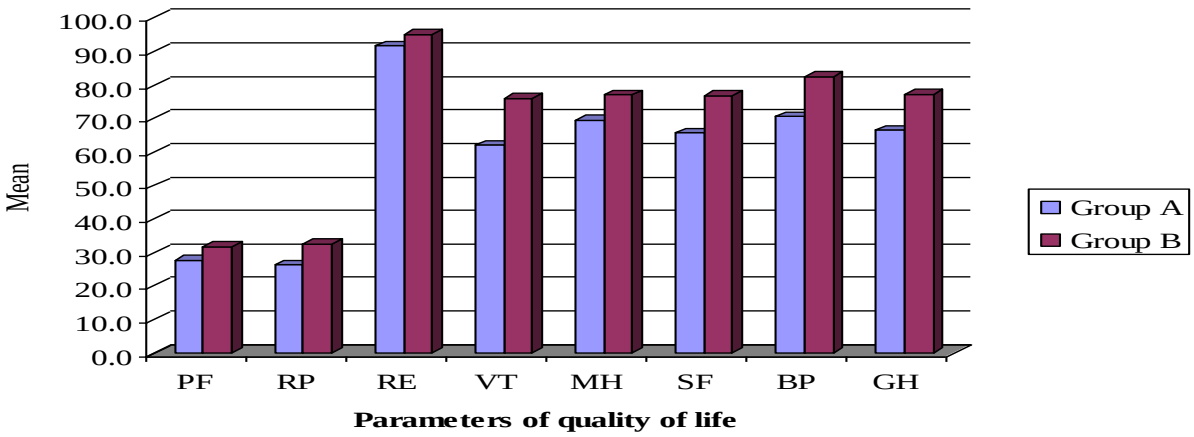

Fig. 1c. Bar graph shows post mean (± SD) QOL parameter scores of Group A (Individual sport) and Group B (Team sport).

Table 2: Pre and post functional independence parameters summary (Mean ± SD, n=20) of two groups.

Parameters	Groups	Pre sport	• Post • sport	p value	% mean change	Fold change (Group B/Group A)
SC	Group A	4.55 ± 0.33	• 4.65 ± 0.29	0.4770	2.2%	
	Group B	4.58 ± 0.34	• 4.89 ± 0.32	0.0022	6.8%	3.1
	p value	0.8046	• 0.0212	-	-	-
RSM	Group A	6.63 ± 1.13	• 6.75 ± 1.12	0.7025	1.9%	
	Group B	6.55 ± 1.14	• 7.50 ± 0.98	0.0278	14.5%	7.7
	p value	0.8236	• 0.0336	-	-	-
M	Group A	2.13 ± 0.31	• 2.21 ± 0.32	0.4190	3.7%	
	Group B	2.00 ± 0.43	• 2.52 ± 0.28	0.0002	26.3%	7.1
	p value	0.2179	• 0.0050	-	-	-

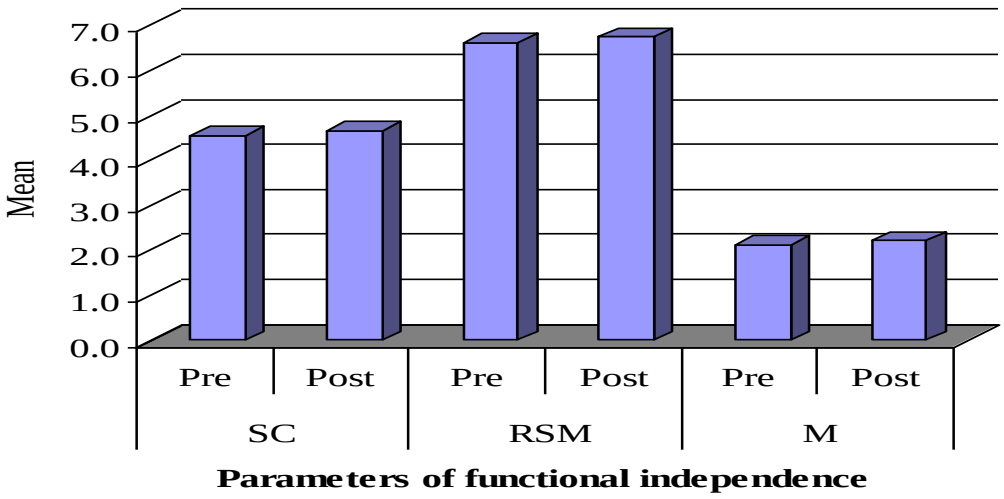

Fig. 2a. Bar graphs shows pre and post mean (± SD) functional independence parameter scores of Group A (Individual sport).

ISSN: 2249-6661
Vol-43, No.-4, (N) October-December (2020)

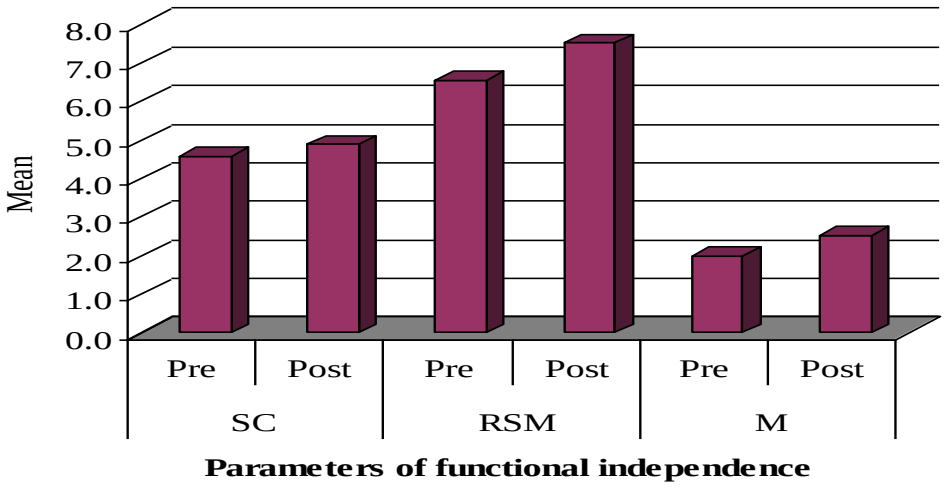

Fig. 2b. Bar graphs shows pre and post mean (± SD) functional independence parameter scores of Group B (Team sport).

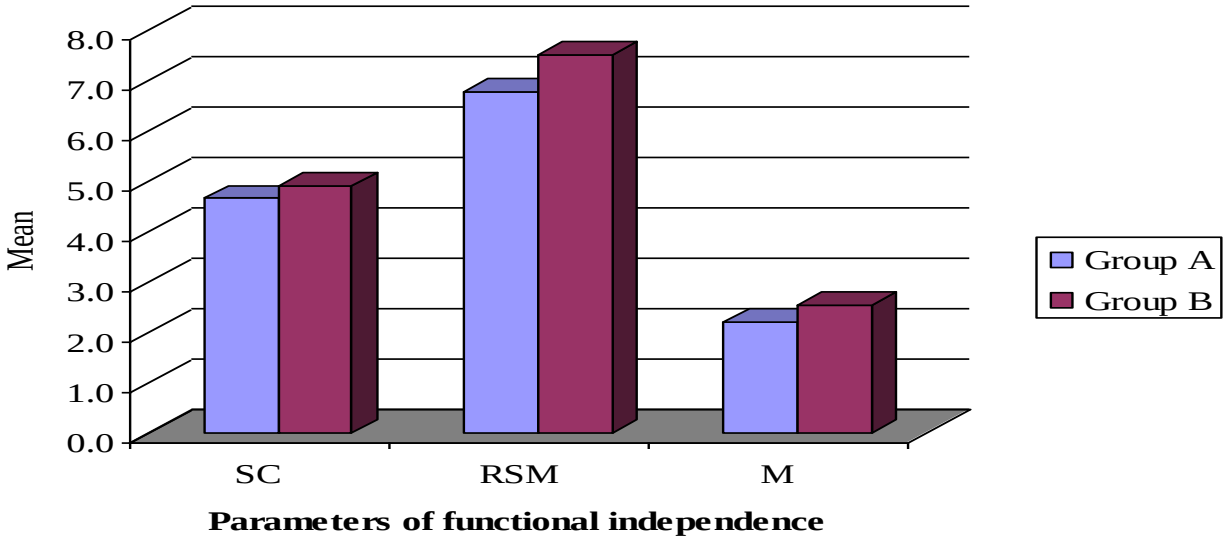

Fig. 2c. Bar graph shows post mean (± SD) functional independence parameter scores of Group A (Individual sport) and Group B (Team sport).

Table 3: Pre and post PHQ-9 scores summary (Mean ± SD, n=20) of two groups

Groups	Pre sport	Post sport	p value	% mean change	Fold change (Group B/Group A)
Group A	0.53 ± 0.23	0.35 ± 0.16	0.0010	34.7%	
Group B	0.52 ± 0.26	0.18 ± 0.14	0.0001	66.4%	1.9
p value	0.9307	0.0103	-	-	-

ISSN: 2249-6661
Vol-43, No.-4, (N) October-December (2020)

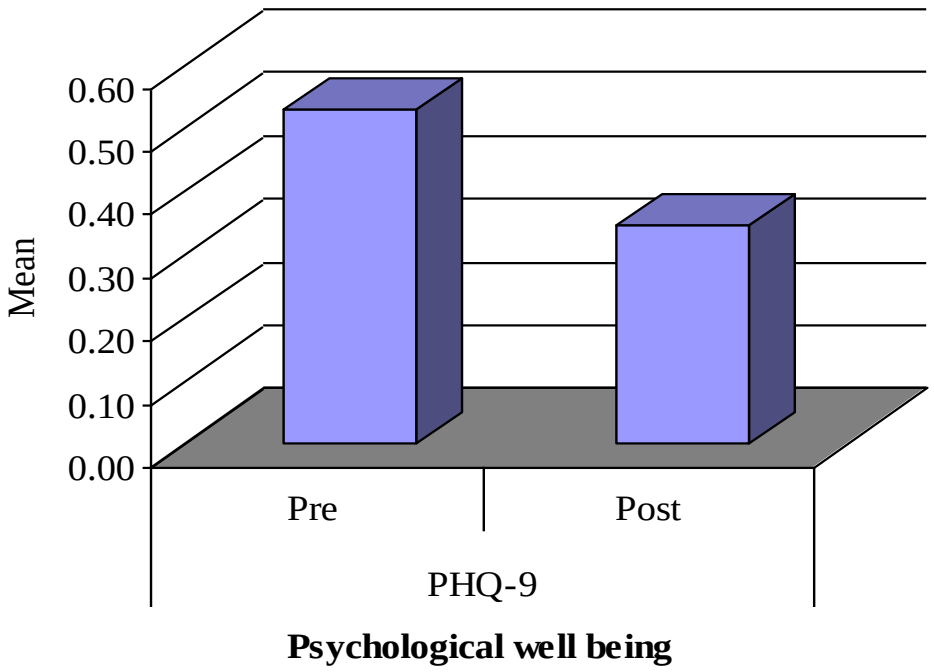

Fig. 3a. Bar graphs shows pre and post mean (± SD) PHQ-9 scores of Group A (Individual sport).

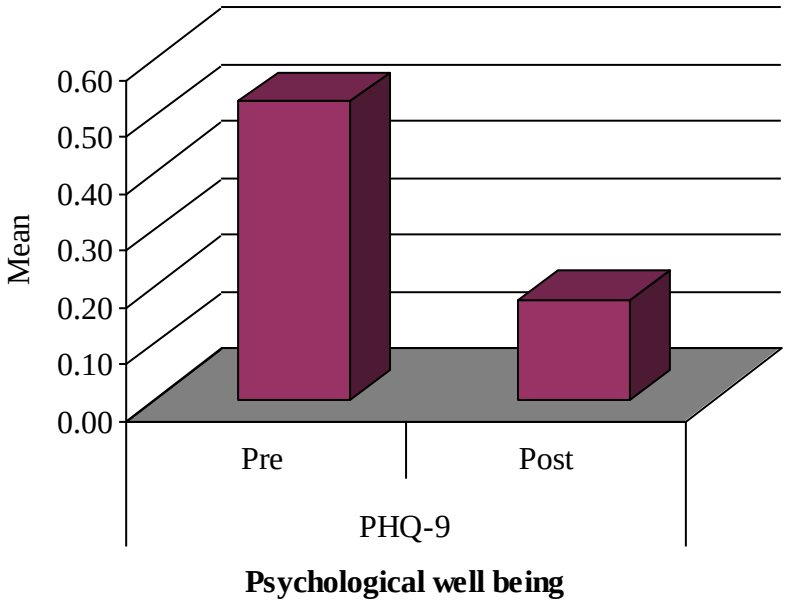

Fig. 3b. Bar graphs shows pre and post mean (± SD) PHQ-9 scores of Group B (Team sport).

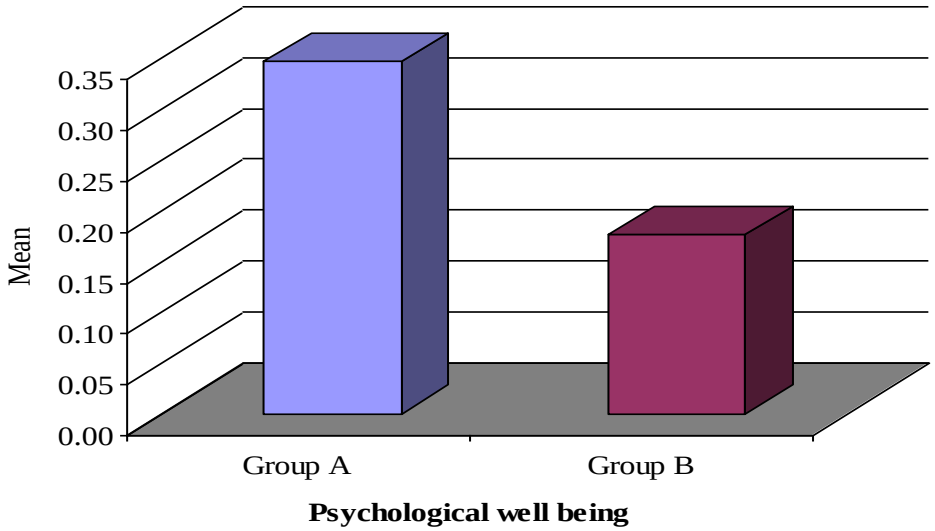

Fig. 1c. Bar graph shows post mean (± SD) PHQ-9 scores of Group A (Individual sport) and Group B (Team sport).

Comparing both the groups, there was significant improvement in team sport than individual sport VT, SF, BP and GH. These results indicate that participants were benefitted more in team sport. Garlick DG (2002) did a study and concluded that there was significant improvement in women playing team sport when compared to non-team sport in terms of displaying better social characteristics, better stress management and body images. These results provide a strong support to our study. So in other words, we can say that both the sports improve RAND 36 but team sport improve it effectively.

In this study, statistical observation revealed pre and post sport functional independence scores of two groups. In Group A, there was some improvement seen in functional independence but the improvement was non-significant. In Group B, there was improvement in all the 3 parameters (SC, RSM and M) and it was highly significant.

Hanson *et al.*, (2001) did a study and measured the effect of sports on level of community integration in spinal cord injury patients. In this study, Forty-eight participants with physical disabilities as well as from SCI support groups. He reported that athletes scored significantly higher on four of five subsections of the CHART (physical independence, mobility, occupation, social integration) which indicates sports can lead to improvement in activities of daily living (ADL).

If we compare both the groups, there was significant improvement ($p<0.05$) in all three parameters- SC (4.65 ± 0.29 vs. 4.89 ± 0.32, $p=0.0212$), RSM (6.75 ± 1.12 vs. 7.50 ± 0.98, $p=0.0336$) and M (2.21 ± 0.32 vs. 2.52 ± 0.28, $p=0.0050$). This may be because the activity in team sport needs more physical activity (basketball) than individual sport (table-tennis).

This study was highly significant in improvement ($p<0.01$ or $p<0.001$) in psychological well-being in both Group A (0.53 ± 0.23 vs. 0.35 ± 0.16, $p=0.0010$) and Group B (0.52 ± 0.26 vs. 0.18 ± 0.14, $p=0.0022$). The results were consistent with previous literature reporting that individual with disability who participates in sports have higher level of psychological well-being. SCI patients who did not participate in sports obtained higher anxiety scores and lower extraversion scores than the sports participants (Gioia *et al*, 2006). This effect probably resides in the increase in endorphins levels of the participants as a result of sports activities and may liven up animate persons by affecting the central nervous system.

Exercise brings about both short and long term psychological enhancement and mental well-being (Dishman, 1985, 1986; Morgan and Goldston, 1987). In present study the results revealed highly significant scores for psychological well-being. Both the groups were effective in improving the scores for depression.

When comparing both the groups, the scores were less in group B than group A (0.35 ± 0.16 vs. 0.18 ± 0.14, $p=0.0103$) showing better and significant psychological benefits in team sport. This may be because groups counter stress by providing members with social sport: personal action and resources that help them cope with minor aspects of every day living, daily hassles, and more significant life crises. Social support is particularly valuable when stress levels increases.

Since findings of this study are in agreement with findings of many other researches,. We strongly recommend that paraplegics should involve in sports to improve their quality of life, functional activity and mental health. Team sports should be prescribed to spinal cord injury patients and they should be incorporated in the rehabilitation. There were some limitations to this study.

The sample size of the participants was small. This study includes two sports but other sports might also influence the quality of life, psychological behavior and functional independence. The sample was limited to a defined area so the results cannot be generalized. Depression levels of the patients were not recorded and braces (TLSO) might affect the performance of players.

Conclusion

This study concluded that sports are highly effective in improving quality of life, functional independence and psychological well-being in paraplegics. Team sports have more benefits than individual sports and these sports improve quality of life, functional independence and psychological well-being in much better way than individual sports.

References

1. AL Hicks, KA Martin, DS Ditor, AE Latimer, C Craven, J Bugaresti and N McCartney, Long-term exercise training in persons with spinal cord injury: effects on strength, arm ergometry performance and psychological well-being, Spinal Cord (2003) 41, 34 ± 43
2. Angela Crawford, M.S.O.T./S., Holly H. Hollingsworth, Ph.D.,Kerri Morgan, M.S.O.T., O.T.R./L., David B. Gray, Ph.D. People with mobility impairments: Physical activity and quality of participation. Disability and Health Journal 1 (2008) 7-13
3. Baumeister, R. F., & Leary, M. P. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. Psychological Bulletin, 117, 497–529
4. C.S. Hanson, D. Nabavi, and H.K. Yuen, The effect of sports on level of community integration as reported by persons with spinal cord injury, American Journal of Occupational Therapy 55 (3) (2001), 332-338
5. Eagleton JR, McKelvie SJ, de Man A, Extraversion and neuroticism in team sport participants, individual sport participants, and nonparticipants, Percept Mot Skills. 2007 Aug;105(1):265-75.
6. Garlick, D G.; Argyrous, G; Orr, F, Psychosocial Effects on Women Playing A Team Sport Compared With Women Playing Non-Team Sports , Medicine & Science in Sports & Exercise: May 2002 - Volume 34 - Issue 5 - p -236
7. Gioia et al, Psychological impact of sports activity in spinal cord injury patients, Scandinavian Journal of Medicine & Science in Sports, Volume 16 Issue 6, Pages 412 – 416, 2005
8. Gordon T, Mao J. Muscle atrophy and procedures for training after spinal cord injury. Phys Ther 1994; 74: 50
9. Guy G. Vanderstraeten, Anne G.M. Oomen, Sports for disabled people: a general outlook, International Journal of Rehabilitation Research 2010, 33:283–284
10. Jacobs P.L et al, Circuit resistance exercises in persons with complete paraplegia, Journal of rehabilitation research and development; 39; 21-28, 2002
11. Kilkens OJ, Post MW, van der Woude LH, Dallmeijer AJ, van den Heuvel WJ. The wheelchair circuit: reliability of a test to assess mobility in persons with spinal cord injuries. Arch Phys Med Rehabil 2002;83:1783-8.
12. Meyer, J. "The Influence of Athletic Involvement on Psychosocial Development, ICAAP Bulletin, 1997(12). Available: http://info.med.yale.edu/chldstdy//IACAPAP/997/997-12htm. [December 15, 1999
13. Nemunaitis G, Haines M, Rizk T, Clark G. The community integration of wheelchair athletes J Spinal Cord Med. 2003; 26(suppl 1):S35.
14. P. Foreman, J. Cull, and R. Kirkby, Sports participation in individuals with spinal cord injury: demographic and psychological correlates, International Journal of Rehabilitation Research 20(2) (1997), 159-168
15. SB O'Neill and S Maguire, Patient perception of the impact of sporting activity on rehabilitationin a spinal cord injuries unit. Spinal Cord (2004) 42, 627–630
16. 16.Souza PA, editor. O esporte na paraplegia e tetraplegia. Rio de Janeiro: Guanabara Koogan, 1994
17. 17.S.Muraki, N Tsunawake,S Hiramatsu2 and M Yamasaki, The effect of frequency and mode of sports activity on the psychological status in tetraplegics and paraplegics, Spinal Cord (2000) 38, 309 ± 314
18. Sonja A. McVeigh et al, Influence of Sport Participation on Community Integration and Quality of Life: A Comparison Between Sport Participants and Non-Sport Participants With Spinal Cord Injury, The Journal of Spinal Cord Medicine Volume 32 Number 2 2009
19. 19.Tamar Z. Semerjian, Suzanne M. Montague, Jesus F. Dominguez, Artin Mejy Davidian, and Ray D. de Leon. Enhancement of Quality of Life and Body Satisfaction Through the Use of Adapted Exercise Devices for Individuals with Spinal Cord Injuries. Top Spinal Cord Injury Rehab 2005;11(2):95–108
20. Wann, D. L. The causes and consequences of sport team identification. In A. A. Raney & J. Bryant (Eds.), Handbook of sports and media (2006) (pp. 331-352).
21. 21.http://www.ipttc.org/rules/ITTF-PTT-Rules-and-Regulations.8th-edition.feb.2010 update.pdf
22. 22.http://www.iwbf.org/pdfs/2008_Rule_Book_V1.pdf
23. 23.http://emedicine.medscape.com/article/88785-overview#showall

APPENDIX – H GLOSSARY

Key Words

SN	-	Serial number
AGE	-	Age in years
SEX	-	1. Male, 2. Female
SCIM	-	Spinal cord independence measure
SC	-	Self-care
RSM	-	Respiratory and sphincter management
7) M	-	Mobility
8) QOL	-	Quality of life
9) PF	-	Physical functioning
10) RP	-	Role limitation due to physical health
11) RT	-	Role limitation due to emotional health
12) VT	-	Vitality (Energy/Fatigue)
13) MH	-	Mental health
14) SF	-	Social functioning
15) BP	-	Bodily pain
16) GH	-	General Health

ISSN: 0474-9030
Vol-68-Issue-3-January-2020

Ccomparative study and current scenario of hydrogen compressed natural gas and Bio-fuels in India

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Introduction

India a fastest growing economy in the world registered a GDP growth of 7.2 % in the month of December. World Bank predicting a 7.3 percent growth in 2018-19 and 7.5 percent growth in 2019-20. It is expected that the Indian economy will double to $5 trillion by 2025. With this fastest growing economy demand cleaner energy. In recent years, the alternative fuel has received renewed attention to use as fuel in internal combustion engines. Due to the higher emission norms of petroleum-based, fuel has created a need for alternative fuels. In last year's more value on reducing pollutant emissions from petroleum-based fuels. This was the reasons that have motivated the development and testing of several low carbon fuels. The conventional diesel and petrol emit more emission than the alternative. This was not only a single reason but also ever increasing energy demand and more about the environmental protection concern, clean combustion with high efficiency has increased attention. Alternative fuels that strive to replace petroleum-based fuels include liquefied Petroleum Gas (LPG), compressed natural gas, (CNG), Hydrogen compressed natural gas (HCNG), ethanol, Biodiesel, vegetable oils, liquefied natural gas (LNG) and bio gas. In the recent year, the natural gas is the most widely used alternative fuel in India. It can be used in the two forms as compressed natural gas (CNG) and liquefied natural gas (LNG). The CNG has become the reality although the research is going on LNG storage in the vehicles. CNG driven vehicles produces the low CO2, negligible NOX and Sox, making it a "clean fuel" as compared to the fossil fuel. The octane number of the natural gas is 130, which makes the engine to be run without knocking, thus increasing its efficiency. However, the hydrogen and the biofuels has been viewed as future secondary fuels for power the internal combustion engines. With the fast increase in the emission of greenhouse gases and environmental legislation is the main factor to use the alternative fuels in internal combustion engines. Hydrogen blend with CNG gives the newer blended gas termed as hydrogen compressed gas (HCNG). Which is the mixture of hydrogen and the compressed natural gas that is why it combines the advantages of both hydrogen and methane. Any of the internal combustion engine is compatible to run on HCNG and do so minimum modification in the engines. It allows the government agencies to promote the hydrogen enriched compressed gas to the larger number of the people with the lass cost. The government can also take the advantages of existing investment in the expansion of natural gas infrastructure and promote it at a larger scale. Same in the case of to use of the biodiesel in the internal combustion engine can help the government to achieve the

ISSN: 0474-9030
Vol-68-Issue-3-January-2020

reduction in emission intensity by 33-35% by 2030.

Hydrogen use in internal combustion engine

Hydrogen is a colorless, odorless, tasteless, flammable gas. It is the clean burning fuel and most abundant element on the earth. Most of the research shows that combustion and the emission characteristics of hydrogen are much better than other fossil fuels. It is the lightest element being about 8 times lighter than methane. Hydrogen may be used in internal combustion engines in the followings forms:

- Neat Hydrogen
- Petrol + Hydrogen
- Hydrogen + CNG (HCNG)
- Diesel + Hydrogen (Dual Fueling)

HCNG is a mixture of compressed natural gas and 8-50% of hydrogen by volume. This fuel is promoted to reduce the carbon dioxide (Co2), nitrous oxide (NOx) and carbon mono oxides (CO) vehicle emission compared to traditional compressed natural gas (CNG). Most of the studies stated that HCNG mixtures with 20-30 % hydrogen by volume are best for the vehicle performance and emission reduction.

Biofuels are the liquid fuels that are mainly derived from biomass or the bio waste. Biofuels commonly advocated as an environmentally friendly.

Subdivision of Bio-fuels

1 G Bio-fuels (First generation) these are the fuels, which are derived from the starch, sugar and vegetable oil. First generation biofuels are useful but limited. Cost of these fuels is higher than the existing fossil fuels such as oil. These are the oil obtained using conventional techniques.

2G Bio-fuels (Second generation) the second-generation biofuels are called "green fuels". They come from sustainable feedstock. Here the sustainable defined by the availability of the feedstock, the impact of its use on environment, its impact on biodiversity, and its impact on land use. These are produced from hemicellulose, cellulose or lignin. Either the second-generation biofuels can be blended with the existing petroleum product or it can be combusted in internal combustion engines. The examples of 2nd generation biofuels are Cellulosic ethanol, Bio hydrogen, methanol, Algae based biofuels.

Fuel	Energy Density (MJ/kg)	Greenhouse Gas (kg/kg)
Ethanol	30	1.91
Propanol	34	N/A
Biodiesel	37.8	2.85
Sunflower oil	40	2.8
Biogas	55	2.74

Table 1: Biofuels energy density and emission

Research Problem

ISSN: 0474-9030
Vol-68-Issue-3-January-2020

As the demand for cleaner fuel increases so do a comparative study between two alternative fuels i.e. HCNG and Bio-fuels and find found the consumer behavior towards both.

Literature Review

S. No.	Title	Major findings	Gap
1	Hydrogen enriched compressed natural gas – a futuristic fuel for internal combustion engines	Emission norms in Internal combustion engine	Compression wit h other fossil fuels
2	Progress in hydrogen enriched compressed natural gas (HCNG) internal combustion engines - A comprehensive review	Different ways to generate the hydrogen, properties required for the engine to perform in the better way, different benefits as compare to CNG	Safety norms for internal combustion engines
3	Opportunities for Bio Fuels - Indian Scenario	Different sources of bio fuels in India, Biomass data collection and methodology,	Consumption Pattern of Biofuels
4	Biofuel Roadmap for India (2015)	Technical and cost for production of second-generation Biofuels, Economic potential of biofuels in terms of ethanol and biodiesel.	Supply chain model
5	National Policy on Biofuels - 2018	Government initiatives in the field of Biofuels, roles and responsibility of the different agencies	
6	A Comparative Analysis of Biodiesel and Diesel Emissions	Differences in the composition of combustion emissions between diesel and Bio-diesel	Factor affecting the demand and supply gap
7	Alternative fuels for internal combustion engines	Fuels specifications and standards used in vehicles	Emission norms for different fuels
8	A Review on Performance and emission characteristi cs of hydrogen enriched compressed natural gas engine.	Effects of hydrogen addition to an engine fuelled with HCNG under various conditions	Factor that affect the HCNG demand

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9	Report on transportation through hydrogen fuelled vehicles in india	Upcoming hydrogen application sector, opportunities and economics viability of hydrogen based fuels	Future demand of HCNG and infrastructure
10	Renewable energy in India: Current status and future potentials	Renewable Energy structure and future demand	Demand and supply gap of biofuels
11	Action plan for clean fuel – CII Niti Aayog "cleaner Air Better Life Initiative"	Deterioration of Quality of air in Delhi, finding the solution to air pollutions by engaging with different stakeholder	Decision parameter to switch more cleaner fuels
12	Energy used by transport systems in India: the role of the urban population, sources, alternative modes and quantitative analyses	General overview of state of art transportation system in India, outlining the related energy consumption for different modes of transport	Factor affects the demand and supply of the different fuels used in different modes of transportation
13	Report on Hydrogen production in india	Technologies available for production of hydrogen,	Factors affects the production of hydrogen
14	Opportunities for Bio Fuels - Indian Scenario	Quantify the district-wise availability of biomass in India and to prepare a zone- wise recommendation for adopting appropriate technologies for converting the biomass into biofuels.	Infrastructure required for adoption of new technology
15	National Hydrogen energy roadmap	Industry driven planning process that offers long-term energy solutions to the growing energy needs of India	End consumer decision parameter

Research Scope/ Need

As the analysis of literature reviews the area for research are as follows:

1- As India is largely depends on imports of crude oil the research can provide the comparative study of Biofuels and HCNG, which fuel will be best for the Indian economy.
2- Government of India is very much focused on to provide the cleaner fuel to the

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consumer so the research is required to study the current infrastructure and policy framework will be sufficient to meet the future demand.

3- The challenges sector faces availability of fuel, storage and safety risk, economy and the cost of production to the Indian economy can be studied to add up more advantage to the business.

Research Question

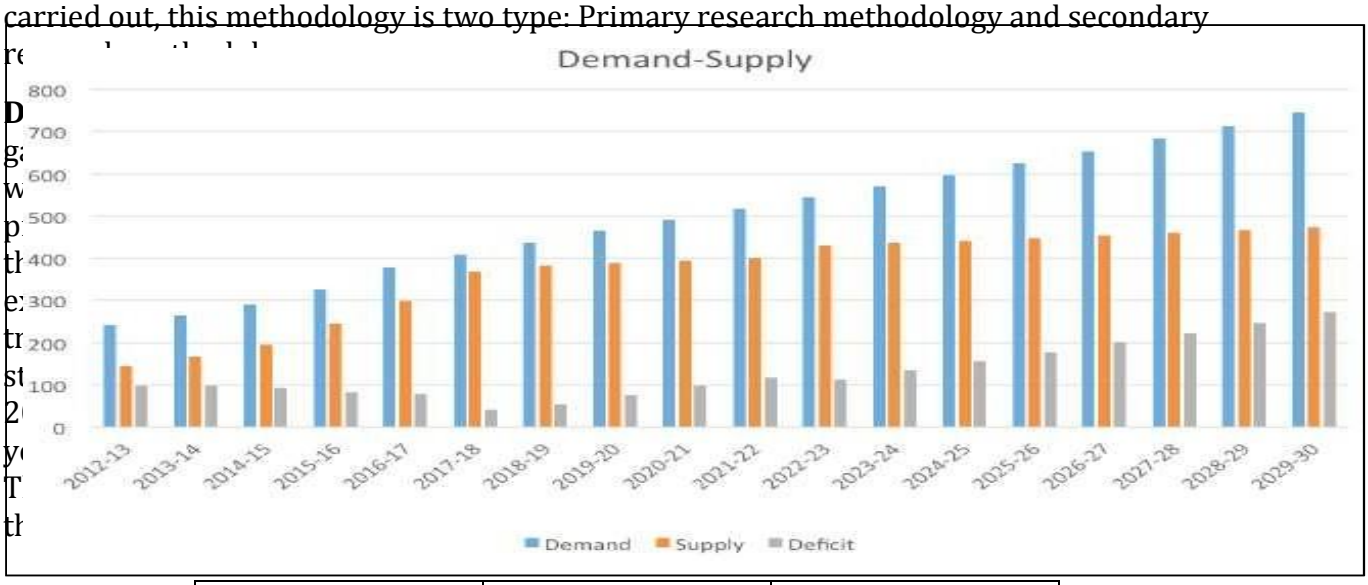
1- Is the current infrastructure and policy framework being sufficient to meet the future demand? 2- What are the different factors that affect the supply and demand of biofuels and HCNG in India? 3- Does the user see for decision analysis whether to switch to the cleaner fuel or not?

Objective of the Study

1- To identify the current demand and supply gap of Bio-fuels and HCNG in India. 2- To understand the current infrastructure and the policy framework
3- End user decision to shift towards cleaner fuel.

Research Methodology

The researcher has decided to limit himself to conventional fuels segment he will only consider the HCNG and Biofuels in the study. The researcher considers restricting himself to a specific segment, gives a broad view about the actual demand and supply gap into the segment. The idea is to derive the cleaner fuel to Indian end consumers. Therefore, the precise scope of the study will be "To provide the general comparative difference between the two conventional fuels and also study the consumer behavior to switch to the cleaner fuel". The researcher considers the following framework to conduct the research. The process of collecting the information and data for study and analysis for making any decision. It is the process of analyzing and studying how particular research has been carried out, this methodology is two type: Primary research methodology and secondary re



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Source	2010	2025
Gas	11 %	20 %

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Oil	30 %	25 %
Coal	53 %	50 %
Hydro	5%	2%
Nuclear	1%	3%
	100%	100%

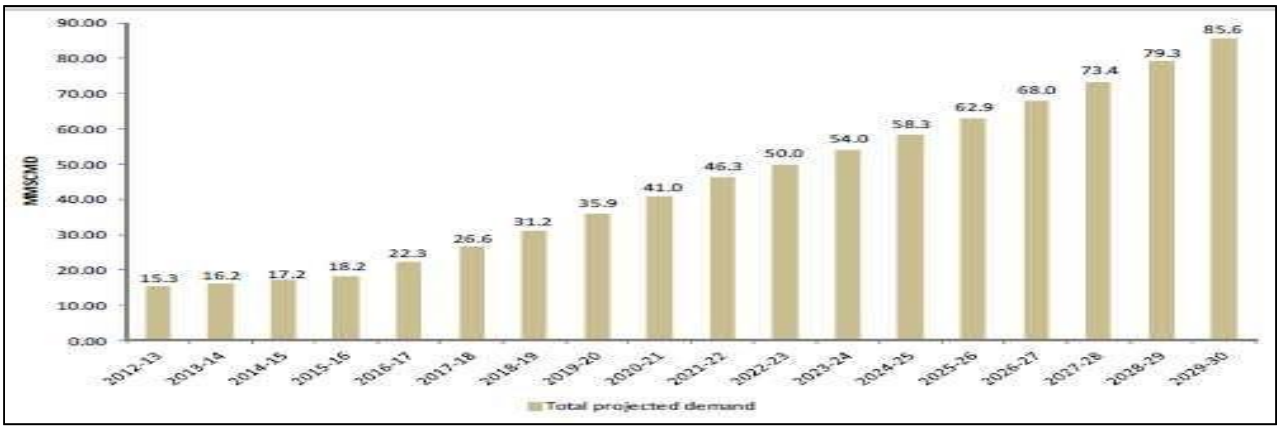
Table 2: Future Primary energy mix of India

Natural gas is cheaper than other alternative fuels like petrol, diesel and FO. On the other side, the price of natural gas totally depends on the international market. Due to the price link with the international market, it seems in the past that more cost of the natural gas to the end user. However, newer technology and larger plants have now made it possible to ensure economies of scale enabling an increase in usage of natural gas.

Present Demand Scenario In the present demand scenario, the natural gas demand has increased due to the government initiative in pipeline projects. Along with this development of transmission and distribution gas infrastructure, will enable the usage of natural gas in place of alternate fuels and supplying gas at affordable prices to end consumers. With the lower natural gas prices, it has become easier for fertilizer the power, industrial, as well as CGD, and commercial establishments, to switch over to natural gas for their energy demand. From the study, it is evidence that in the upcoming future fertilizer and power sectors will be expected to remain the main segments for natural gas demand in India.

CGD Sector Demand The demand for natural gas for city gas distribution (CGD) sector in India has witnessed fast growth in recent years. According to the PPAC, it consumes approx. 13.6 MMSCMD of natural gas. Natural gas demand for city gas distribution sector is expected to rise on the higher side due to the addition of gas networks in new cities. Along with this, the price advantage has become main factor to use of CNG for automobile, PNG in domestic, commercial sector and industrial segments.
Environmental pollution, which is the main concern, will further push the use of natural gas especially in the automobile and industrial segment. The demand of the natural gas from CGD sector has been expected to grow at a rate 20%-30%. The projected demand from the CGD sector are listed below.

Figure 2: Total projected demand from CGD network



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Demand drivers in City gas distribution

There following are the main drives for demand in city gas distribution

- Requisite Infrastructure
- Supply of domestic gas
- Environmental concerns
- Enabling policy framework
- GDP/household
- Availability of affordable RLNG

Existing Pipeline Network In India there are three major pipeline entities, they supply the natural gas across India. These are GAIL, RGTIL and GSPL. The larger entity is GAIL, which is a government entity operating about 11410 km of trunk pipelines in India comprising 70.31% share of in pipeline network. The major pipeline includes HVJ, Dadri-Bawana-Nangal, DVPL, DPPL, and Dabhol-Bengaluru trunk pipelines to evacuate domestic gas as well as imported RLNG at the larger side. In addition to these pipelines, GAIL also operates regional gas pipeline networks in, K.G.Basin, Cauvery Basin and Gujarat. RGTIL and RGPL are operating 1784 km of pipelines about 10.99% in the total share, namely the East- West Pipeline (EWPL) to supply gas from KG-D6 field in the state of Andhra Pradesh. GSPL consisting 2593 km pipeline supply of natural gas in the state of Gujarat and have a total share of 16%.

S.No	Transporter	Length KM	% share
1	GAIL	11410	70.31%
2	GSPL	2593	15.98%
3	RGPL	1784	10.99%
4	DNPL	299	1.84%
5	IOCL	140	0.86%
	Total	16226	100%

Table 3: Existing gas Pipeline network in India

Pipeline under construction The Indian government decided to develop the natural gas grid In order to promote the usage of natural gas as a fuel and the feedstock for the fertilizers plants across the country and move towards a gas based economy. In that development of additional 11,216 Km long gas pipeline is under way to complete the Gas Grid.

Network/ Region	Entity	Length (KM)
Kochi – kottanad – Bangalore – Mangalore	GAIL India	1056
Dabhol – Bengaluru Spur line phase -2	GAIL India	302
Jagdishpur – Haldia – Bokaro – Dhamra	GAIL India	2539

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Mallavaram – Bhopal – Bhilwara – Vijaypur	GSPL India	1881
Mehsana – Bathinda	GSPL India	2052
Bathinda – jammu – shrinagar	GSPL India	725
Kakinada – Vizag – Srikakulam	APGD	391
Ennore – Nellore	GTIP	250
Ennore – Thiruvallur – Bengaluru – Punducherry - Nagapattinam-Madurai-Tuticorin	IOCL	1385
Jaigarh-Mangalore	H-Energy	635
Total		11,216

Table 4: Under construction gas pipeline network

Pradhan Mantri Urja Ganga Project (Jagdishpur - Dhamra - Haldia & Bokaro Pipeline Project (JHBDPL): The 2539 km. pipeline project is being executed at an investment of Rs.12,940 Crore. It will receive to the energy requirements of five states, which are West Bengal, Odisha, Bihar, Jharkhand and Uttar Pradesh.**Barauni to Guwahati Pipeline:** To extend the Gas Grid upto North East, development of a 729 Km long pipeline from Barauni to Guwahati has been allowed as an integral part JHBDPL project. This pipeline will pass through the Assam, Sikkim, West Bengal and Bihar. This Project is scheduled to be commissioned by December 2021.

North East Region (NER) Gas Grid: To further extend the gas grid to each states of North-East and Sikkim, a Joint Venture (JV) company, named as Indradhanush Gas Grid Ltd, has been formed by five Oil & Gas Central Public Sector Undertakings (CPSUs) i.e. ONGC, OIL, GAIL, IOCL, & NRL. This JVC will develop NER Gas Gird of about 1656 Km long in all North Eastern States i.e. Assam, Sikkim, Mizoram, Manipur, Arunachal Pradesh, Tripura, Nagaland and Meghalaya in a phased manner at the total cost of about Rs. 9265 Crore.

Kochi-Kootenai-Bangalore-Mangalore Pipeline (Phase-II): GAIL is developing 872 km long pipeline passing from the state Kerala & Tamilnadu with a total project cost of Rs 5150 Crore.

City Gas Infrastructure in India Government has put strong accentuation on expansion of city gas distribution (CGD) network coverage across the country, to make available natural gas to the public at large, CGD networks ensure the supply of cleaner fuel (i.e. PNG) to households, Industrial & commercial units as well as transportation fuel (i.e. CNG) to vehicles. Till 2017, only 19% of the country's population spreading over 11% of the country's area was covered for development of CGDs in 96 Geographical areas.To boost the CGD sector, 10th Bidding Round was launched in March, 2019 for 50 Geographical Areas (GAs) covering 124 districts in 14 States in 14 states, 18% geographical area of the country and 24% of the population. 38 entities (Public and Private) participated in this round and

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submitted total 406 bids for all 86 GAs. 84 GAs has been authorized to the successful bidders for the development of CGD networks. With the conclusion of 10th round, it will expand the coverage of CGD networks to about 70% country's population spreading over 50% of India's area. The growth of CGD coverage has potential to attract total investment of more than Rs 1,20,000 Crore in gas value chain with generation of about 3 lakh employment opportunities in coming years.

Status of CNG stations and CNG vehicles across India till date

State	CNG station	No of CNG vehicles
Andra Pradesh	31	19,703
Chandigarh	5	7,500
Dadara & Nagar Haveli	3	876
Daman and Diu	3	1,000
Delhi	470	10,63,111
Gujarat	496	9,08,319
Haryana	63	1,57,289
Karnataka	12	1,079
Kerala	4	900
Madhya Pradesh	38	35,853
Maharashtra	293	9,08,324
Odisha	6	2,346
Punjab	3	1,735
Rajasthan	5	8,162
Telangana	39	24,804
Tripura	8	11,556
Uttar Pradesh	109	1,51,074
Uttarakhand	1	100
West Bengal	7	3,7 35
Total	1,596	33,07,466

Table 5: No of CNG stations in different states of India

Emission analysis in HCNG and Biofuels:

The IOCL research & development centre tests the technology has set up natural gas compact reformer for HCNG at Faridabad and use CNG blend with 18% mix of hydrogen. After the test perform the company had mapped the emission using HCNG in the heavy duty vehicles and find the following result

- 70% reduction in CO emission
- No reduction in NOx same as in CNG
- 15% reduction in total hydrocarbon
- 4-5% Improvement in fuel economy.

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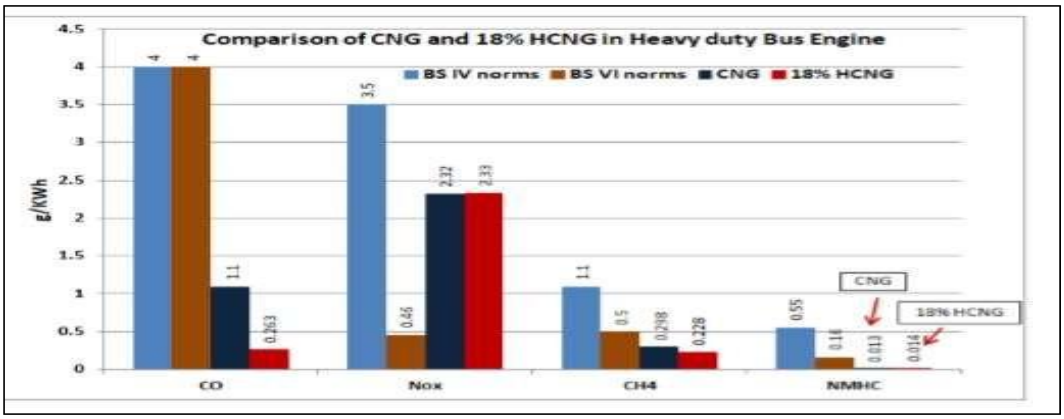

Figure 3: Emission compression of CNG and 18% HCNG

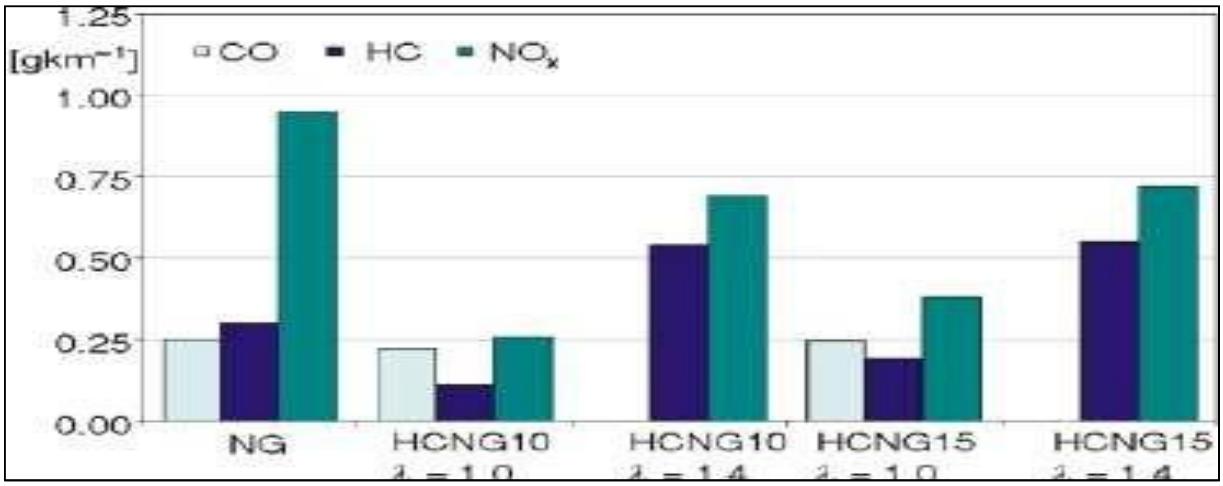

Figure 4: Emissions of different volumes of HCNG

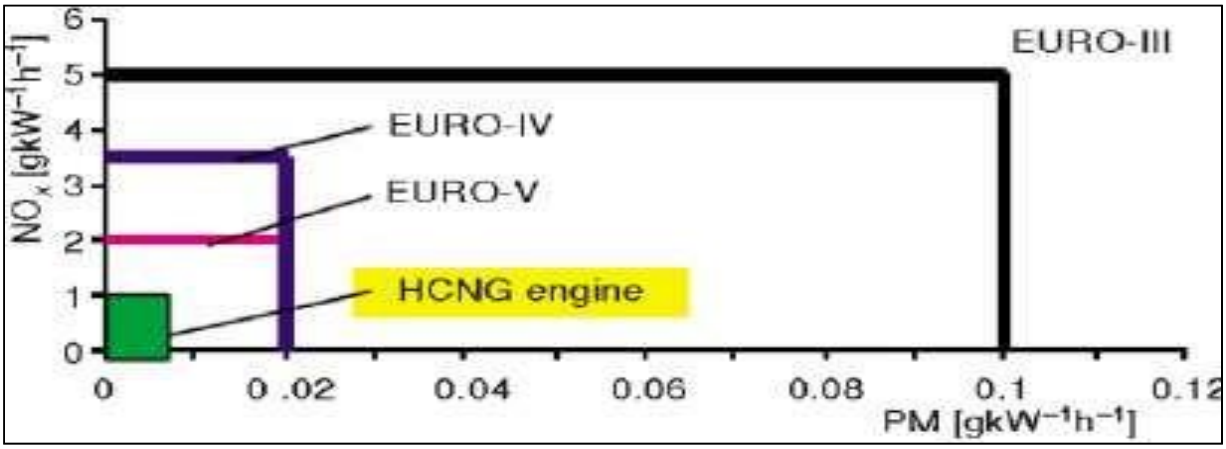

Figure 5: HCNG engine emission potential

Diesel and biodiesel mixtures at different composition Most of the researcher has tested the diesel biofuels mixture at a different concentration to determine the effects of fuel composition on toxic emission concentrations. To perform this experiment pure low

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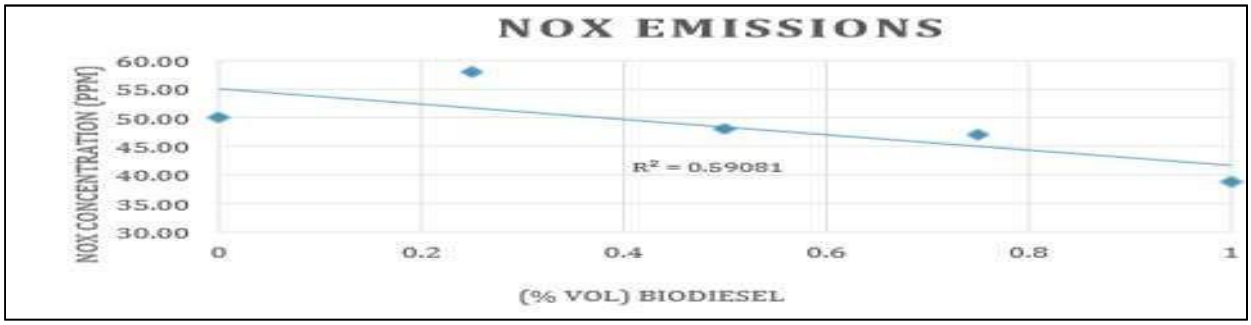
sulfur diesel and canola oil-based biodiesel was used and started on heavy duty highway engines and after perform compare the data.

Figure 6: NOx concentration at different volume of biodiesel mixture



Nitrogen Oxide (NOx) compounds concentrations has a linear relationship. As the percentage of biodiesel increases, the NOx concentrations decreased. Which shows the lower NOx emission in the biodiesel.

Carbon monoxide emission Carbon monoxide was also measured for each diesel-biodiesel mixture at different level of concentration. With the testing of the mixture CO measurements were on the lower side for different concentration of the diesel-biodiesel mixture.

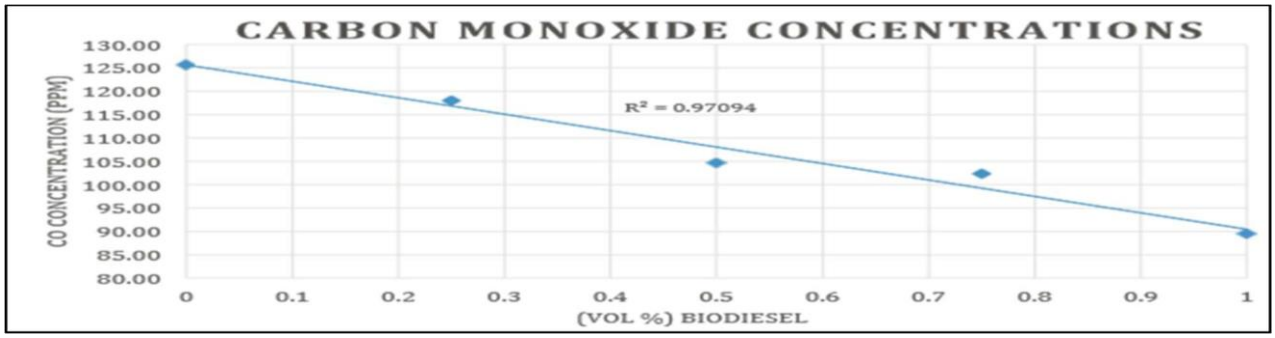


Figure 7: Carbon monoxide concentration at different volume of biodiesel mixture

The above figure it is clear that there a strong negative linear correlation between CO concentration. This decrease in CO emissions is found in all of biodiesels; with this was the main reason to use as a fuel.

Carbon dioxide emission

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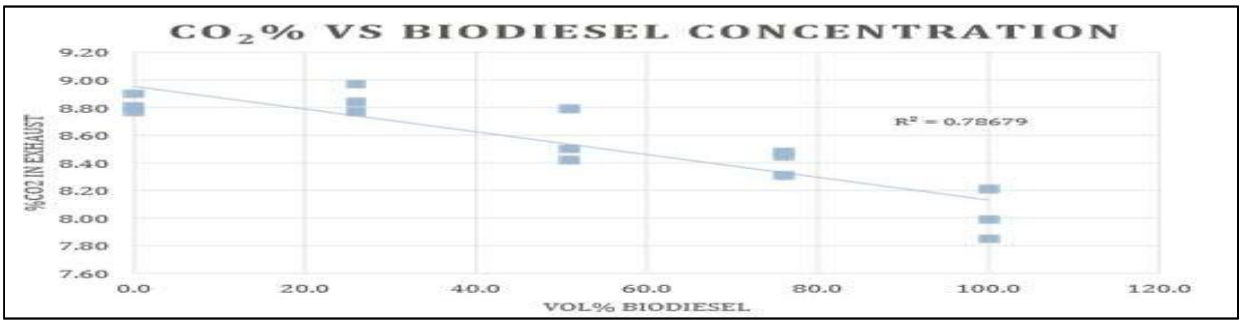


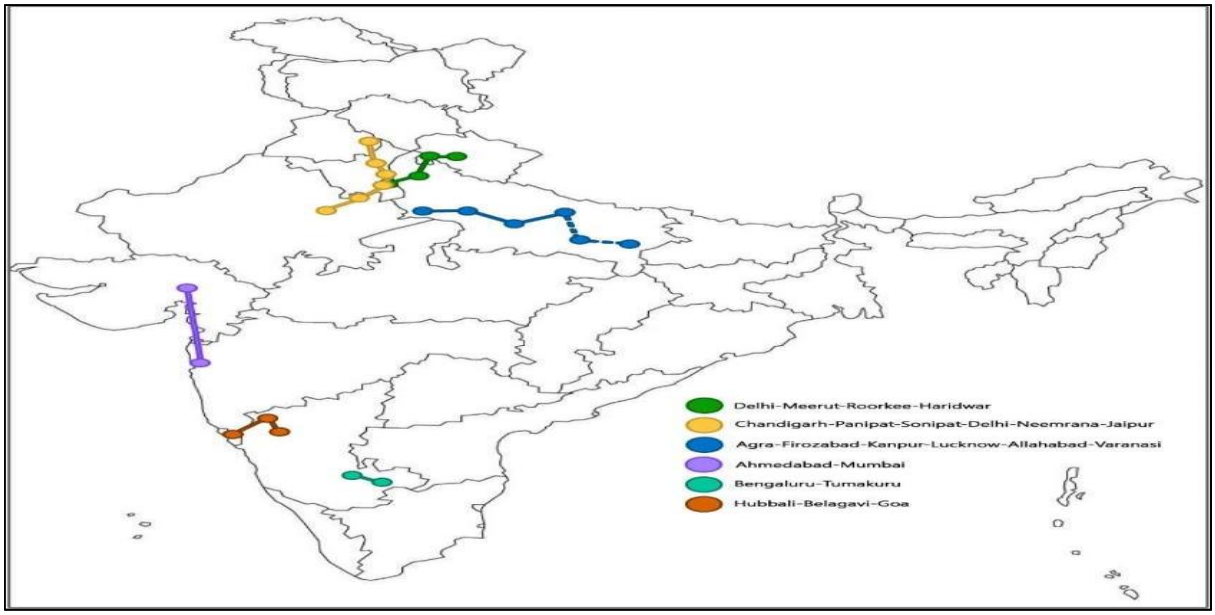
Figure 8: Co2 concentration at different volume of biodiesel mixture

In Biodiesel, a cleaner burn achieved at higher temperature this is the main reason to use as a fuel in the internal combustion engines. To conduct the various experiment at a different level of diesel and biofuel mixture it was evidence that CO2 decreased as biodiesel concentration

Government future Plan on Biofuels and HCNG

Green corridor Government of India plan to implement a "Green Corridor" project to provide the availability of CNG beyond city limits. So that the clean fuel can be used in internal combustion engines for long distance journeys. It also enhances the CNG usage. Under this project CNG Stations have already been commissioned at Vijaipur (Madhya Pradesh) and Dibiyapur (Uttar Pradesh)

Figure 9: List of the pipelines comes under green corridor



Bio-Fuels It is evidence that demand for natural sector highest across all the sectors in terms of end users. Due to the huge demand in the transport sector, the demand for petroleum products will be on the higher side. Due to the increase, the no of vehicles on road demand for petrol and diesel will rise from 26.1 MMT and 80.4 MMT respectively in the year 2017-18 to 31.1 MMT and 110 MMT by the year 2021-22. The government is

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much focus on the low carbon emission fuels and bio-fuels will provide a higher degree of carbon reduction. It also reduces dependence on import and meeting the energy needs. With the intention to reducing the carbon emission and import dependency on fossil fuels, the Government has been promoting and uplifting production of different alternative fuels. There are generally two biofuels are used in the present term, which are as

a) Ethanol, Which is comes from sugar molasses and comes under second generation biofuels used for blending with petrol
b) Biodiesel, Which derived from oil waste and tree borne oil seeds and used for blending with diesel.

Ethanol Blended Programme Indian Government gave permission to sell a fixed percentage of ethanol- blended petrol up to 10% through Ethanol blended programme. In continue the government taking into the consideration of prices of such fuels that includes the various factors such as falling down the oil prices in the international market, firming of sugar prices. Taking the consideration of such factor a revision of ethanol prices to 39 per litre during ethanol supply in the year 2016-17. It also cames into the picture, for the ethanol supply year 2016-17 and about 66.51 crore liters of ethanol obtained because of lower sugarcane generation in the Country. In this case, the government had increased the price of the ethanol during the ethanol supply in the year 2017-18 at a rate of 40.85/ liter. Through this initiative, the government instilled faith in the ethanol suppliers.

2G Ethanol Programme the government of India plan to set up second-generation (2G) ethanol Bio refineries with the help of Oil PSUs. The main objective behind this to increase the production of ethanol in the country. These 2G Ethanol Bio refineries are set up in 11 states in the country. In this manner, the MRPL has been mandated by the MoPNG, to set up a second-generation ethanol Bio refinery plant in the state of Karnataka. Second generation bio-fuels are also called "Advance Bio-fuels". These are produced from sustainable feedstock. MRPL is planning a second-generation ethanol plant with an initial capacity of 60 KLPD. Some benefits from the advance bio-fuels are as follows:

- This will help in reducing the import dependency and will help in reducing the oil import bill of the country.
- Reducing the greenhouse gas emissions, thereby reduction in CO2 and CO emissions
- Some additional source of income to the farmers.

Biodiesel Programme the Government of India has allowed direct sale of Biodiesel for blending with High Speed Diesel (HSD) to end consumers but the government define some standard to blend of ethanol and other biofuels, which should be in line with the standard specified by Bureau of Indian standards.

HCNG the Indian government is in the stage to supply the cleaner fuel to the end consumer, to make this more successful the IOC R&D Centre has bought more focus its work on the newer technology of compact reforming process. This technology called HCNG.

Current Status and tests result on H-CNG until date Niti Aayog a government of India enterprises recommends that HCNG as an alternative fuel for the vehicles and will utilize the existing gas pipeline infrastructure to deliver at the end consumer. In the first stage, this will implement in the national capital region. To make more successful the government agencies list the regulatory policies to support the new technology some of are as follows:

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a. Notification of HCNG can be used as an alternative fuel
b. Bureau of Indian Standards to issue standards for use of H-CNG as a fuel
c. Safety side, PESO will issue clearance for H-CNG storage on vehicles

IOCL has already tested the HCNG on 6 CNG heavy duty engines using HCNG with a mixture of 18% of hydrogen and has concluded that it can be used in the vehicles with a little modification in the existing engines. The most important part of this technology is that it will allow for the utilization of the existing gas infrastructure of CNG buses as well as the piping network. Due to this, it can be seen as the next generation CNG for automobiles.

A study on costs of HCNG deployment in Delhi

The Environment pollution control authority (EPCA) with the help of IOC research and development center work out the cost for use of HCNG in all the buses of Delhi. This will include cost of setting up the hydrogen compactor and cost of running the bus using the hydrogen mixed fuel. Further calculation for HCNG required for per day to fuel of 5,500 buses, it would require 400 tons of HCNG per day. If we take the cost of H compactor into consideration it will be estimated to be 330 crore. It is estimated that the fuel cost to increase by Rs 0.75 per km as compared to CNG. From the above study, it is clear that costs are not prohibitive, hydrogen technology can be scaled up and implement across the full buses in Delhi. To implement HCNG programme in Delhi, EPCA recommended the following:

MoPNG, IOCL research and development center along with IGL and Delhi transport department be directed to give a plan for use of HCNG in the entire buses of the city. The objective would be to bring in HCNG with NOx controls with in the limit for entire public transport system of buses by 2020-2021.

Comparative chart

	Biodiesel	**HCNG**
Chemical Structure	Methyl esters of C12 to C22	CH4 and Hydrogen
Feed stock	Fats and oils from soybeans, waste cooking oil etc	Underground reserves
Energy Content (Higher heating value)	357 MJ/l	522 MJ/kg
Energy Content (Lower heating value)	334 MJ/l	469 MJ/KG
Physical state	Liquid	Compressed gas
Cetane no	48-65	N/A
Pump Octane no	N/A	120+
Flash Point	100 – 170 oc	-184 oc
Auto ignition temp	149 oc	540 oc

Table 6: Fuels properties comparison

Silent features of National Policy on Biofuels – 2018

To reduce the import dependency: According to the calculation, 1 liter of ethanol saves approximate Rs 28 crore of foreign exchange at current rates rupees rate. The supply of

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ethanol was 150 crore liters in the year of 2017-18, which will help to save of Rs 4000 crore of foreign exchange.

Cleaner environment: 1 liter of ethanol saves 20,000 ton of CO2 emission. Further, it was noted in the year of 2017-18 that there was lesser emission of CO2 with the approximate value of \30 lakh ton. It may be further reduced, crop burning and conversion of agriculture/waste to biofuels. It is estimated that by adopting the 2G bio refineries technologies agriculture waste, which is burnt by the farmers, can be converted into ethanol. In addition, farmers are at risk of not getting the right price for their produce during the surplus production phase. Thus, conversion of agricultural biomass can help in price stabilization.

Findings

- Most of the population is aware of the CNG propelled vehicles
- Even most of the people do not have the CNG propelled vehicles but they prefer CNG vehicles to conventional fuel vehicles.
- Most of the population have awareness about that HCG and the Biofuels can be used as a fuel in the internal combustion engines.
- Most of the population have the awareness about that HCNG, Biofuels have the lower emission as compared the fossil fuels, and they are ready to pay extra amount for CNG kit to enable the vehicle run on CNG.
- The consumer is ready to pay 2-4% initial high price for the cleaner fuel and have the opinion that CNG vehicles are more economical.
- The focus question, most of the population have the opinion that the current infrastructure is not sufficient to meet the future demand.
- The awareness about the cleaner fuel is more important in this way some suggestion such as RO driven awareness campaign, mandate about the CNG kit, Pan India gas grid etc these will help to meet the less emission target in the coming future.

Conclusion

It is clear that India aims to evolve as a gas-based economy and government has taken the initiative to push multiple facets to increase the consumption of cleaner fuels. It is clear from the study it is advantageous to use of HCNG as a fuel in the internal combustion engine. To make this more success India can use the existing city gas distribution infrastructure to deliver the fuel to the end consumer. In addition to this, there is no major modification is required in the engine to run on HCNG. However, the existing gas infrastructure is not sufficient to meet future demand, 80% of the geographic distribution of India yet to come under CDG network. On the same side, the government allow the ethanol blending 20% in petrol and 5% blending of biodiesel in diesel. With this, the government can achieve it reduce the energy emission by 30-35%. To make the programme more successful government should take some initiative to spread awareness about cleaner fuels. From the primary research some initiative such as make the pan India gas grid to cater the more geographic area, mandate the CNG kit in the vehicles. From the study, it is also clear that is willing to pay an initial high price for the cleaner fuel.

List of Variables

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Glossary of Abbreviations	
GDP	Gross domestic product
CNG	Compressed natural gas
HCNG	Hydrogen compressed gas
CGD	City gas distribution
GA	Geographical area
IOCL	Indian oil corporation Ltd
MoPNG	Ministry of Petroleum and natural gas
EPCA	Environment Pollution Control Authority
HSD	High speed diesel
CO	Carbon monoxide
NOx	Nitrogen oxides
CO2	Carbon dioxide
GSPL	Gujarat state petroleum corporation
PESO	Petroleum and explosives safety organization
IGL	Indraprastha gas
APGD	AP gas distribution
GTIP	Gas Transmission India Pvt
PPAC	Petroleum planning and Analysis cell
MMT	Million metric tons
MJ	Megajoules

Bibliography

1. Kasianantham NANTHAGOPAL, Rayapati SUBBARAO, Thangavelu ELANGO, Ponnusamy BASKAR and Kandasamy ANNAMALAI hydrogen enriched compressed natural gas (hcng) – a futuristic fuel for internal combustion engines
2. Priyanka Goyal and S.K. Sharma (2014). Review on Opportunities and Difficulties with HCNG as a Future Fuel for Internal Combustion Engine
3. Narendra Kumar Pal (2009). Successful Adoption of CNG and Emerging CNG-H2Program in India
4. Ashwani Kumara, Kapil Kumarb, Naresh Kaushikc, Satyawati Sharmaa, Saroj Mishrad (2017). Renewable energy in India: Current status and future potentials
5. Christina Wulf, Petra Zapp (2018). Assessment of system variations for hydrogen transport by liquid organic hydrogen carriers
6. Shahana Bano, Praveen Siluvai Antony, Vivek Jangde b, Rajesh B. Biniwale (2018). Hydrogen transportation using liquid organic hydrides: A comprehensive life cycle assessment
7. Kari Alanne, Sunliang Cao (2017). Zero-energy hydrogen economy (ZEH2E) for buildings and communities including personal mobility
8. M. V. C. SASTRI (2008). hydrogen energy research and development in India--an overview
9. Published on Ministry of New and Renewable Energy (2018). Hydrogen Energy
10. National Hydrogen Energy Board Ministry of New and Renewable Energy

ISSN: 0474-9030
Vol-68-Issue-3-January-2020

Government of India (2018). National hydrogen energy roadmap
11. Central statistics office ministry of statistics and programme implementation government of india new delhi (2018). Energy Statistics
12. Pinna1, B. Dalla Chiara1 & K. Pant (2016). Energy used by transport systems in India: the role of the urban population, sources, alternative modes and quantitative analyses
13. Pallav Purohit, Subash Dhar (2016). Promoting low carbon transport in india Biofuel roadmap for india
14. S S Raju, Shinoj Parappurathu, Ramesh Chand, P K Joshi, Praduman Kumar, Siwa Msang (2016). Biofuels in India: Potential, Policy and Emerging Paradigm
15. P. Shinoj, S.S. Raju, Ramesh Chand, Praduman Kumar and Siwa Msangi (2017). Biofuels in India: Future Challenges
16. Stephen Tambari, Ibor Benjamin, Dokibo Daso, Kanee Sorbari, Allison John (2015). Evaluation of Comparative Analysis in the Use of Petrol and Compressed Natural Gas (CNG) As Vehicular Fuel
17. Petroleum & Natural Gas Regulatory Board (2018). "Vision 2030" Natural Gas Infrastructure in India
18. Joshua Wayne Curto, Matthew David Giambrone, Alexander Scott MacGrogan, George Hutchinson Williamson IV (2016). A Comparative Analysis of Biodiesel and Diesel Emissions
19. Federation of Indian Petroleum Industry (FIPI) (2018). Policy & Economic Report - Oil & Gas Market
20. Petroleum Planning & Analysis Cell (Ministry of Petroleum & Natural Gas) (2019). Snapshot of India's Oil & Gas data