THE COMPENDIUM OF JUBILEE RESEARCH DAY

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Editors:
Ms. Mridula Vellore
Ms Angel Davis
Ms Chaithanya M

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Editors
Ms. Mridula Vellore
Ms. Angel Davis
Ms. Chaithanya M

FOREWORD

For the third consecutive time, the Jubilee Centre for Medical Research (JCMR) facilitates researchers from all Jubilee institutions to showcase their research ideas and ongoing projects on the auspicious occasion of the Jubilee Research Day, part of the decennial celebrations of the Research Centre's establishment. The Jubilee Research Day is exclusively conducted for Jubileeans to interact with fellow researchers and discuss their novel findings. It is a fountainhead for new ideas, thoughts, concepts, and innovations, which will be translated into discoveries in the future.

As part of the Jubilee Research Day celebrations, I am pleased to present the abstracts of selected research works conducted at Jubilee institutions over the last year. I take this opportunity to thank all the authors for their contributions to this book. I hope this book will encourage further research and inspire more researchers to participate in the coming years. Although this book contains only a small part of the research conducted at Jubilee, I believe it will provide readers with a glimpse of the excellent work happening here.

I wish to congratulate and express my gratitude to the entire team of JCMR for their dedication and commitment to celebrating the Jubilee Research Day. I look forward to the continued support of all Jubileeans in our future endeavors.

Dr. D M Vasudevan
Research Director

JUBILEE CENTRE FOR MEDICAL RESEARCH

Jubilee Centre for Medical Research (JCMR) is the central research facility of all the institutions under the Jubilee Mission Hospital Trust. This is a DSIR recognized and KUHS approved research center. It is a recognized center by Ministry of finance u/s 35 I (ii) to receive donations and Ministry of Corporate Affairs for carrying out CSR activities.

JCMR is established by the Jubilee Mission Hospital Trust. The other Institutions under the Trust are the following.

1. The Jubilee Mission Medical College Hospital established in 1951 and now one of the largest hospitals in Kerala with a 1500 beds inpatient capacity and 1750 out patients per day with 32 specialty departments. Also offers DNB programme of Central Board.
2. Jubilee Mission Medical College affiliated to Kerala University of Health Sciences (KUHS)
   Medical College offers MBBS course, 18 MD/MS courses and 2 DM programmes.
3. Jubilee Mission College of Nursing, B.Sc & M.Sc nursing courses
4. Jubilee Mission School of Nursing
5. Jubilee Ayurveda Mission Hospital & Research Institute
6. Jubilee Mission College of Allied Health Sciences

To involve in research activities, along with clinical practice, is a commitment of faculty and students of these institutions. The faculty and students are actively participating in various research programs funded by government and private sectors and the parent institution. JCMR has completed several research projects funded by ICMR, DRDO, DST, DBT,DHR, KSCSTE etc. Currently there are 20 external funded research projects. JCMR has central govrnment recognized Human and Animal Ethical Committees. Ph.D programs in the faculty of Life science, Medicine, Nursing, Paramedical & Allied Health Sciences are undertaken.

Contents

MICROBIOLOGICAL AND CLINICO-EPIDEMIOLOGICAL CHARACTERISTICS OF INFLUENZA VIRUSES IN PATIENTS PRESENTING WITH INFLUENZA-LIKE ILLNESS AT A TERTIARY CARE TEACHING HOSPITAL

Neeraj P Vinod[1], Ardra M[2]

[1] MBBS student, [2] Department of Microbiology, JMMC&RI

Background

Influenza viruses are a major cause of acute respiratory illness worldwide, contributing to significant morbidity across all age groups. Understanding their microbiological and clinico-epidemiological profile is essential for timely diagnosis and effective public health interventions.

Objective

To determine the clinico-epidemiological profile of patients with microbiologically confirmed Influenza virus infection and to determine the types of circulating Influenza viruses in patients with Influenza Like Illness (ILI).

Methodology

This record-based observational study included patients with laboratory-confirmed influenza, diagnosed via real-time PCR. The specific type of influenza virus was identified using data from the Influenza Truenat Register maintained by the Molecular Diagnostic Laboratory. Clinico-epidemiological data—such as patient history, comorbidities, clinical presentation, laboratory results, complications, and final outcomes—were retrieved from archived hospital case records in the Medical Records Library. Data analysis was performed using appropriate statistical methods.

Results

Among 280 confirmed influenza cases, 216 (77.1%) were influenza A and 64 (22.9%) influenza B. The peak was in August (97 cases, 34.6%), followed by September (20%) and

July (18.2%). Most patients were aged 51–60 years (19.6%) and 71–80 years (17.5%). Influenza B was more common in younger individuals, especially 21–30 years (23.4%). Notably, influenza B cases showed a rising trend from July to September and predominantly affected younger individuals aged 21–30 years (23.4%).

The most common comorbidities included hypertension (38.6%), diabetes (31.1%), coronary heart disease, and chronic respiratory illness (both 13.2%). Fever (98.2%) and cough (86.8%) were the predominant symptoms. Breathlessness (28.6%) and myalgia (21.1%) were also noted..

Inpatient care was required in 96.1%, with 30.1% needing oxygen, 15.9% ICU care, and 4% ventilator support. Neutrophilia and lymphopenia were observed in 53.4% and 48.7%, respectively. Inflammatory markers were more elevated in influenza A.

The overall cure rate was 98.5%, with 4 deaths (1.4%). Secondary bacterial infections occurred in 2.5%. Comorbidities were significantly associated with ICU admission, longer hospital stay, and oxygen requirement. Influenza A correlated significantly with ILI category C, elevated markers, and intensive care needs.

Conclusion

The molecular-level confirmation of influenza cases in the present study reveals a complex picture of viral circulation, with Influenza A predominating while Influenza B shows an intriguing increase. The study underscores the dynamic nature of influenza viruses and the importance of continuous monitoring and adaptive healthcare approaches including utilization of advanced diagnostic techniques and strengthening vaccination drives among high-risk population.

Keywords: Influenza, clinico-epidemiology, influenza like illness, seasonal trend, comorbidities

MICROBIOLOGICAL PROFILE OF RESPIRATORY PATHOGENS IN CHILDREN WITH ACUTE RESPIRATORY ILLNESS USING BIOFIRE FILM ARRAY BASED MULTIPLEX PCR

Bentin Joy[1] , Chithra Valsan N[2] , Rosmi Jose[2]

[1]MBBS student, [2]Department of Microbiology, JMMC&RI

Background

Acute respiratory infections are a leading cause of hospitalization and morbidity in children worldwide. Rapid and accurate identification of causative pathogens using multiplex PCR can aid in timely diagnosis and targeted treatment.

Objectives

- To study the distribution of aetiological agents in acute respiratory illness in children
- To find out the demographic, clinical and laboratory trends during the course of the illness in these infections during their hospital stay.

Methodology

This retrospective observational study was conducted over a period of six months and included 115 children admitted to the pediatric ward with acute respiratory infections. Nasopharyngeal samples from these patients were analyzed using the BioFire FilmArray multiplex PCR system.

Results

Out of 115 samples, 95 (82.6%) tested positive for one or more pathogens using the BioFire respiratory panel. Single pathogens were detected in 70 cases, while 25 showed co-infections—21 with two pathogens and 4 with three. Adenovirus (29.03%) was the most common pathogen, followed by Rhinovirus (22.5%) and SARS-CoV-2 (12.09%). Viruses were found in 94 cases and bacteria in 3.

The most frequent co-infections were Rhinovirus/Parainfluenza 3 and Adenovirus/Rhinovirus, each seen in 3 cases. Most affected children were aged 1–12 months;

56.5% were male. Fever was the predominant symptom, followed by cough, rhinitis, breathlessness, and seizures.

Chest X-rays were done in 51 cases; 49 showed abnormalities. Elevated CRP was noted in 12 of 104 tested. ICU care was required in 34 patients (29.6%), with 2 needing mechanical ventilation. One infant died (0.86% mortality) with Rhinovirus and Bordetella pertussis co-infection. Mean hospital stay was 5.4 days—6.51 days for single infections vs. 5.69 for co-infections.

Statistical analysis revealed associations between specific pathogens and clinical features, e.g., Rhinovirus and fever, PIV3 and fever, SARS-CoV-2 and loose stools.

Conclusion

The importance of determining the causative organism lies in the choice of treatment. Often, antibiotics are prescribed for viral infections, which can contribute to multi drug resistance. On the other hand, bacterial infections can be underdiagnosed and this can lead to severe complications. However, it is difficult to make an aetiological diagnosis from a clinical basis and there are only few studies enumerating the profile of pathogens causing respiratory infections in India. Several platforms like multiplex PCR are available for the rapid diagnosis of the pathogens and timely diagnosis utilising such advanced methods helps in prompt medical care and improved patient outcome

Keywords: Biofire FilmArray, multiplex PCR, microbiological profile

A STUDY ON THE KNOWLEDGE ABOUT WEST NILE FEVER AND THE SOURCES OF INFORMATION AMONG UNDERGRADUATE MEDICAL STUDENTS IN CENTRAL KERALA

Joann Mathews[1], Preethi M Shenoy[2]

[1] MBBS student, [2] Department of Biochemistry, JMMC&RI

Background

West Nile Fever is an emerging mosquito-borne viral disease of public health concern, with sporadic outbreaks reported in parts of India, including Kerala. This study aims to relate the knowledge about West Nile fever to the information sources that the medical students refer to in order to obtain knowledge.

Objectives

- To determine the level of knowledge about West Nile fever among undergraduate medical students in Central Kerala
- To identify the sources of information that the undergraduate medical students refer to in order to obtain knowledge about emerging health care conditions.
- To compare the level of knowledge and the sources of information among undergraduate medical students.

Methodology

A structured, self-administered online questionnaire was used to conduct the survey under direct supervision. The questionnaire included two sections: one assessing knowledge about West Nile Fever and the other exploring the students' sources of information. Knowledge levels were categorized as poor (<60%), moderate (60–80%), and good (>80%) based on scoring. A total of 140 undergraduate medical students participated in the study.

Results

Among 140 participants, 65% had moderate knowledge of West Nile Fever, 5% had good knowledge, and 30% had poor knowledge. While 36.4% reported reading health topics beyond textbooks, only 11.4% referred to PubMed articles despite 77.14% being familiar with the platform. Of those exploring beyond textbooks, 41.2% used reliable sources like PubMed and Medscape, while 49% relied on general internet sources such as social media, Wikipedia, and YouTube.

A significant association was found between higher knowledge scores and the use of trusted scientific materials. Additionally, 60.71% reported watching medical shows for information, and 67.1% turned to the internet when encountering a newly reported disease in the community.

Conclusion

Sensitization sessions on identifying and using credible information sources should be integrated early in the medical curriculum, ideally during the foundation course. Early exposure helps inculcate critical thinking, discernment, and a habit of continuous learning. In today's digital age, where misinformation can spread rapidly—especially during public health crises—it is essential for future healthcare professionals to distinguish between reliable and unreliable sources. Equipping students with these skills prepares them to make informed clinical decisions, stay updated with evolving medical guidelines, and respond effectively during emergencies. Moreover, such training empowers them to take on leadership roles in promoting and disseminating accurate health information within their hospitals and communities. By embedding this awareness at the start of their education, we lay a strong foundation for building a healthcare system that is not only scientifically sound but also ethically responsible and socially responsive.

Keywords: Emerging diseases, information sources, medical students

ASSESS THE KNOWLEDGE AND ATTITUDE ON PREVENTION OF NON-ALCOHOLIC FATTY LIVER DISEASE AMONG AT-RISK INDIVIDUALS

Ancy C.J[1], Aleena Sabu[1], Agnus Mariya[1], Akshaya A[1], Aleena Benny[1], Aleena Joby[1], Ancil Suhruth[1], Aneesha C[1], Anusha Selvin Mary[2], Sheeja Sebastian[2], Angela Gnanadurai[2]

[1]B.Sc Nursing Students, [2]Medical Surgical Dept, JMCON

Background

Non-Alcoholic Fatty Liver Disease (NAFLD) is a rapidly emerging public health concern among individuals with risk factors. Understanding the level of knowledge and attitude toward NAFLD prevention will help identify gaps that need to be addressed through health education and preventive strategies.

Aim

To assess the Knowledge and Attitude on Prevention of NAFLD.

Objectives

- To assess the level of knowledge and attitude on prevention of NAFLD among at-risk individuals.
- To associate the level of knowledge and attitude on prevention of NAFLD among at- risk individuals with selected demographic and clinical variables.
- To correlate between the knowledge and attitude on prevention of NAFLD among at-risk individuals

Methodology

A descriptive cross-sectional study was conducted among 80 participants at JMMC & RI identified as at risk for NAFLD. Participants were selected using non-probability convenience sampling based on criteria like Type 2 Diabetes Mellitus, dyslipidaemia, obesity, or hypertension. Data were collected using a validated questionnaire covering socio-demographic and clinical profiles, knowledge on NAFLD, and attitudes toward the disease. Descriptive statistics assessed knowledge and attitude levels, while inferential statistics

examined associations with demographic variables. Correlation analysis was also conducted to evaluate the relationship between knowledge and attitude scores.

Results

Among the 80 participants, 65% were over 50 years old, with 58.8% males and 41.3% females. The majority were Hindus (58.8%) and had completed high school education (61.3%), while 26.3% had no formal education and 12.5% were graduates. About 45% were employed in physically demanding jobs. Clinically, 13.75% reported a family history of liver disease, 51.25% had Type 2 Diabetes Mellitus, 48.75% had hypertension, 25% had high cholesterol, 36.25% had cardiac diseases, and 60% engaged rarely in physical activity.

Regarding knowledge on NAFLD prevention, 78.8% had moderate knowledge, 11.3% high knowledge, and 10% low knowledge. In terms of attitude, 96.3% showed a highly positive attitude, while 3.7% had a moderately positive attitude. A statistically significant positive correlation ($p < 0.01$) was observed between knowledge and attitude scores, indicating that higher knowledge was associated with a more favorable attitude toward NAFLD prevention. However, no significant association ($p > 0.05$) was found between knowledge or attitude levels and socio-demographic or clinical variables.

Conclusion

This study assessed the knowledge and attitude toward preventive strategies for NAFLD and found that while most participants had moderate knowledge, a majority demonstrated a highly positive attitude. These findings highlight the need for targeted health education initiatives and routine screening, especially among high-risk groups, to effectively reduce the burden of NAFLD.

Keywords: Non- alcoholic fatty liver disease, NAFLD, knowledge, attitude, At-risk individuals, prevention

AWARENESS AND UTILIZATION OF GOVERNMENT WELFARE SCHEMES AMONG SENIOR CITIZENS ATTENDING A TERTIARY CARE CENTER IN THRISSUR

Angel C Benny[1], Anjana Saji[1], Anjana Uthaman[1], Anjitha Joju[1], Anjitha Ravi[1], Ann Mariya Jolly[1], Anna Rose T John[1], Anosha George[1], Remya Ramachandran [2], Sheeja Sebastian[2], Angela Gnanadurai[2]

[1]B.Sc Nursing Students, [2]Medical Surgical Dept, JMCON

Background

India's demographic transition has led to a growing elderly population, many of whom face increasing economic dependency in their daily lives. Government welfare schemes for senior citizens—such as IGNOAPS, Vayovandana Yojana, and IGNWPS—aim to enhance their quality of life by offering financial assistance, healthcare support, and access to essential services. These programs play a crucial role in promoting economic independence and improving overall health outcomes among the elderly.

Objectives

- To assess the awareness regarding government welfare scheme among senior citizens
- To determine utilization of government welfare schemes among senior citizens
- To find out the association of awareness and utilization of government welfare schemes among senior citizens with selected variables.

Methodology

An analytical cross-sectional study was conducted among 400 senior citizens aged 60 years and above who met the inclusion criteria and were receiving care from both inpatient and outpatient departments of a tertiary care center in Thrissur. A self-structured questionnaire was administered to assess participants' awareness and utilization of government welfare

schemes designed for the elderly.

Result

Out of the 400 participants, 347 (86.75%) demonstrated average awareness, 50 (12.5%) had good awareness, and only 3 (0.75%) showed poor awareness of the available government welfare schemes. Utilization of schemes such as IGNOAPS, social security benefits, and IGNWPS was reported by 300 participants (75%). A statistically significant association was found between awareness and educational status ($p = 0.002$), as well as between utilization and factors such as educational status ($p = 0.007$), family income ($p = 0.011$), and APL/BPL status ($p = 0.021$).

Conclusion

The study highlights that a majority of senior citizens had at least moderate awareness of government welfare schemes, and a substantial proportion were actively utilizing key schemes like IGNOAPS and IGNWPS. These findings emphasize the need for continued education and outreach, particularly targeting less educated and economically disadvantaged groups, to ensure optimal access and benefit from available welfare programs.

Keywords: Awareness and utilization, Government welfare scheme, senior citizen, Elderly healthcare, Socioeconomic factors

UNDERSTANDING IMMUNIZATION AWARENESS AND PERCEPTION AMONG CAREGIVERS OF UNDER-FIVE CHILDREN IN A PEDIATRIC CARE SETTING

Ansu Elsa Varghese1, Anupa Joshy[1], Arya Varghese[1], Ashitha Saji[1], Asna Ali[1], Beneeta Eldhose[1], Binisha M D[1],Christy Therese George[1], Jaicy John[2], Tresa Anto[2], Angela Gnanadurai[3]

[1]B.Sc Nursing Students, [2]Dept of Pediatrics,
[3] Medical Surgical Dept. JMCON

Background

Immunization is one of the most effective public health interventions for reducing childhood morbidity and mortality. The role of caregivers is crucial in ensuring timely and complete vaccination of under-five children. Their knowledge and attitude significantly influence immunization uptake and coverage. This study was conducted to assess the knowledge & attitude regarding immunization among caregivers of under five children in Pediatric wards, OPD &immunization clinic of JMMC & RI.

Objectives

- To assess the level of knowledge regarding immunization among caregivers of under-five children.
- To assess the level of attitude regarding immunization among caregivers of under five children.
- To associate the level of knowledge &attitude regarding immunization among caregivers with selected socio - demographic data variable of caregivers.

Methodology

A descriptive cross-sectional study was conducted among 80 caregivers of under-five children, selected through convenience sampling. Knowledge regarding immunization was assessed using a self-structured questionnaire, while attitudes were measured using a validated attitude scale.

The study revealed that the majority of caregivers, 34 (42%), were aged between 26–30 years. Most were female (66, 82%) and 68 (85%) were mothers of the children. A significant

proportion were Christians (29, 36%), unemployed (48, 60%), and had a high school level of education (27, 34%). Over half of the participants (44, 55%) belonged to the APL category. Most children (77, 96%) were immunized according to age, and 65 (81%) of caregivers had prior knowledge about immunization.

Regarding knowledge levels on immunization and immunization status, 10 (13%) had inadequate knowledge, 46 (58%) moderate, and 24 (30%) adequate. For vaccine-preventable diseases, 37 (46%) had inadequate knowledge, 30 (38%) moderate, and 13 (16%) adequate. In terms of attitude, 26 (33%) showed a highly positive attitude, while 53 (66%) demonstrated a moderate attitude toward immunization. Statistical analysis showed significant associations between caregivers' knowledge and socio-demographic variables such as religion (χ^2=13.897, p=0.008) and occupation (χ^2=12.568, p=0.014). Caregivers' attitude was significantly associated with gender (χ^2=7.815, p=0.005) and relationship to the child (χ^2=7.512, p=0.006).

Conclusion

The study highlights that the majority of caregivers of under-five children possess moderate levels of knowledge and a generally positive attitude toward immunization. However, gaps remain in awareness of vaccine-preventable diseases, indicating the need for targeted health education to enhance caregiver knowledge and reinforce positive immunization practices.

Keywords: Immunization awareness, Caregivers, Under-five children, Vaccine-preventable diseases, Knowledge and attitude, Pediatric healthcare

AWARENESS AND ATTITUDE TOWARDS PAIN MANAGEMENT USING EPIDURAL ANALGESIA DURING LABOUR AMONG ANTENATAL MOTHERS

Hivya C S[1], Delna Doji[1], Delna Mariya[1], Dona Binu[1], Gagana K C[1], Gilchrist James[1],Helna Mariya[1], Irene T A[1], Justy Joy[2], Reena Vincent[2], Angela Gnanadurai[3]

[1]B.Sc Nursing Students, [2] Obstetrics and Gynecology Nursing Dept, [3] Medical Surgical Dept, JMCON

Background

Labour pain is one of the most intense forms of pain experienced by women, and effective management is essential for a positive childbirth experience. Epidural analgesia is a widely used and effective method for labour pain relief, yet awareness and acceptance among antenatal mothers remain variable. Understanding their knowledge and attitude towards this method can help guide educational interventions and improve maternal care.

Objectives

- To assess the awareness and attitude towards pain management using epidural analgesia during labour among antenatal mothers.
- To correlate the awareness and attitude towards pain management using epidural analgesia during labour among antenatal mothers.
- To associate the awareness and attitude towards pain management using epidural analgesia during labour among antenatal mothers of with selected socio demographic and clinical variables.

Methodology

A quantitative cross-sectional study was conducted among 80 antenatal mothers after obtaining informed consent and ensuring confidentiality. Participants were selected using a systematic random sampling technique. A self-structured questionnaire assessed awareness, while a 5-point Likert scale

evaluated attitude towards pain management using epidural analgesia. Data were analyzed using both descriptive and inferential statistical methods.

Results

Among the 80 antenatal mothers surveyed, 41.25% were aged 26–30 years, 40% were graduates, and 50% were housewives. Nearly half (46.25%) reported a monthly income of ₹16,000–30,000, and 45% resided in rural areas. A majority were primigravida (52.5%), with 38.75% in the gestational age range of 33–36 weeks. Most (92.5%) had no previous experience with epidural analgesia, and 70% had not attended antenatal classes.

Regarding awareness of epidural analgesia, 60.3% had moderate awareness, 35% had low awareness, and only 6.25% had high awareness. In terms of attitude, 88.5% exhibited a neutral stance, 10% had a positive attitude, and 1.25% had a negative attitude. A mild positive correlation between awareness and attitude was statistically significant ($p = 0.004$). Attendance at antenatal classes showed a highly significant association with awareness levels ($p = 0.001$). No significant associations were found between attitude and sociodemographic or clinical variables.

Conclusion

The study assessed antenatal mothers' awareness and attitude towards epidural analgesia and found that most had moderate awareness and a predominantly neutral attitude. This indicates limited understanding and potential uncertainty about its role in labour pain management. The findings underscore the importance of structured antenatal education to enhance knowledge and empower mothers to make informed, confident decisions for a more positive birthing experience.

Keywords: Awareness, Attitude, Pain management, Epidural Analgesia, Labour, Antenatal mothers

LEVEL OF ANXIETY AMONG PATIENTS UNDERGOING UPPER GASTROINTESTINAL ENTEROSCOPY IN JMMC & RI

Mary Merin Jose[1],Iva Rose Jiju[1], Joona John[1], Josna Benny[1], Niya P.P[1], Neha Babu[1], Rithika Vinosh[1], Riya Robinson[1], Priya Mathew[2], Dhanya Maria[2], Angela Gnanadurai[3]

[1]B.Sc Nursing Students, [2] Dept of Mental Health Nursing,
[3]Medical Surgical Dept, JMCON

Background

Upper gastrointestinal (GI) enteroscopy is a commonly used diagnostic procedure that allows direct visualization of the esophagus, stomach, and duodenum using a flexible endoscope. GI symptoms are frequently reported in the general population, often necessitating this investigation. Despite its widespread use and clinical value, many patients experience significant pre-procedural anxiety, which can affect their overall experience and cooperation.

Aim

To evaluate psychological burden in terms of anxiety among patients undergoing Upper GI Endoscopy.

Objectives

- To assess baseline sociodemographic and clinical data variables among patients undergoing Upper Gastrointestinal Enteroscopy.
- To assess level of anxiety among patients undergoing Upper Gastrointestinal Enteroscopy in JMMC &RI.
- To find association between anxiety level and sociodemographic & clinical data variable in patients undergoing Upper Gastrointetinal Enteroscopy in JMMC& RI.

Methodology

A descriptive study was conducted among 80 patients aged above 18 years undergoing upper gastrointestinal enteroscopy at JMMC & RI. Participants were selected using a

convenient sampling technique. The data collection tool comprised two sections: Section A captured sociodemographic and clinical variables, while Section B utilized the Spielberger State-Trait Anxiety Inventory to assess patient anxiety levels. Data were analyzed using both descriptive and inferential statistical methods.

Results

Out of the 80 patients assessed, 22 (27.5%) exhibited low, 18 (22.5%) moderate, and 40 (50%) high levels of state anxiety prior to undergoing upper gastrointestinal enteroscopy. Regarding trait anxiety, 41 patients (51.3%) had low, 28 (35%) had moderate, and 11 (13.8%) had high levels. A statistically significant association ($p < 0.05$) was found between the presence of comorbidities and anxiety levels, supporting the research hypothesis that comorbidities are linked to increased anxiety among patients undergoing this procedure.

Conclusion

This study revealed that a significant proportion of patients undergoing upper gastrointestinal enteroscopy experienced high levels of state anxiety. Furthermore, the presence of comorbidities was significantly associated with increased anxiety levels. These findings highlight the importance of pre-procedural psychological support and tailored interventions to reduce anxiety and improve patient experience.

Keywords: Anxiety, Patients undergoing Gastroscopy, Upper gastrointestinal enteroscopy.

ASSESSMENT OF KNOWLEDGE ON RABIES PREVENTION PRACTICES AMONG HOUSEHOLDS IN NADATHARA, THRISSUR

Rose Mariya U Paulson[1], Sachin Sabu[1], Sephaniya Sabu[1], Shiyona K[1], Sija Jose[1], Sneha Johnson[1], Sneha Shaji[1], Sona Shaju[1], Sreejesh S[1], Nimmy Tharian[2], Seeja Jacob[2], Angela Gnanadurai[3]

[1]B.Sc Nursing Students, [2] Community Health Nursing Dept,
[3] Medical Surgical Dept, JMCON

Background

According to WHO, rabies causes approximately 59,000 human deaths each year, with 95% occurring in Asia and Africa. It is a fatal but preventable viral disease transmitted primarily through the bite of infected animals. Inadequate awareness and delays in post-exposure treatment remain key challenges, highlighting the need for public education in endemic areas like Kerala.

Aim

To assess and improve the knowledge on Rabies prevention practices among household in a specified area in Nadathara, Thrissur.

Objectives

- To assess level of knowledge on Rabies prevention among households in a specified area in Nadathara , Thrissur.
- To assess level of practice on Rabies prevention among households in a specified area in Nadathara, Thrissur.
- To determine correlation between level of knowledge and practice regarding Rabies prevention among households in a specified area.
- To find out association between level of knowledge and practice with their selected sociodemographic variables.

Methodology

A quantitative research approach with a descriptive design was used to assess the knowledge and practices related to rabies prevention among 90 household heads from the 16th and 17th

wards of Nadathara, selected through convenient sampling. Data were collected using three tools: a socio-demographic and clinical questionnaire covering variables such as age, gender, education, occupation, income, family type, residence, history of contact with stray dogs, dog bites, and vaccination status of family members and animals; a structured 10-item questionnaire to assess knowledge on rabies prevention; and a 10-statement checklist to evaluate rabies prevention practices. The information was gathered through interviews conducted by the researcher and analyzed using descriptive statistics.

Result

The study revealed that the majority of participants (48.9%) were between 55–70 years of age and 86.7% were females. Nearly half (45.6%) had secondary education, and most were unemployed (54.4%). A large proportion (87.6%) belonged to nuclear families, all residing in rural areas. Over half (58.9%) had no contact with stray dogs, and 50% had vaccinated their domestic animals in the past year. However, 58.9% of household members had not been vaccinated against rabies. While 82.2% had received some information on rabies prevention, the study found a mild negative correlation between knowledge and practice scores (significant at the 0.01 level), suggesting that increased knowledge only slightly influenced preventive practices. Education showed a significant association with the level of knowledge ($p = 0.006$).

Conclusion

A majority of households had moderate knowledge about rabies prevention, actual preventive practices were only mildly influenced by this knowledge. Educational status was significantly associated with awareness levels, emphasizing the role of literacy in public health education. Strengthening awareness campaigns and translating knowledge into action are essential to improve rabies prevention practices at the community level.

Key words: Practice on Rabies Prevention, households.

EFFECT OF WELLNESS INTERVENTION PROGRAM ON QUALITY OF LIFE AMONG ELDERLY POPULATION

Ancilin V J[1], Angela Gnanadurai[2], Anand M K[3]

[1]Msc Nursing student, [2]Medical Surgical Dept., JMCON,
[3]Dept of General Medicine, JMMC & RI

Background

Quality of life is varying from place to place or various geographic areas based on social systems, health care and country's economy. Health is an important component in Quality of life especially in elderly. Age associated bio-psychosocial changes result in chronic illnesses, psychological issues, and problems related to inactivity.

Aim

To assess effect of wellness intervention program on quality of life among elderly population in old age homes.

Objectives

- To assess the effect of wellness intervention program among elderly in old age homes before and after the intervention
- To compare the effect of wellness intervention program on quality of life among elderly before and after intervention
- To associate the pretest level of quality of life with selected socio demographic and clinical data variables.

Methodology

A quantitative quasi-experimental one-group pretest–posttest design was used to evaluate the effect of a wellness intervention program on the quality of life among the elderly population. The study was conducted among 30 elderly residents of old age homes, specifically Assissi Nilayam Agathi Mandiram, Marathakara, and Holy Family Home for the Aged, Mannuthy, in Thrissur district. Participants were selected using a probability simple random sampling technique. The wellness intervention program was implemented, followed by a pretest,

and a posttest was conducted six weeks later. Data collection tools included a socio-demographic and clinical profile proforma, the OPQOL-Brief questionnaire to assess quality of life, a rating scale to evaluate participants' perception of the intervention, and a daily intervention completion assessment checklist. Data were analyzed using descriptive and inferential statistics.

Results

In the pretest assessment of overall quality of life (QoL), the majority of participants 24 (80%) had a moderate QoL, while 6 (20%) had a low QoL; none reported a high QoL. In contrast, the posttest revealed that 19 (63.3%) participants attained a high QoL, and 11 (36.6%) had a moderate QoL, with no participants reporting low QoL. The posttest OPQOL-Brief scores were significantly higher than the pretest scores. Specifically, the mean posttest QoL score was 43.00 (SD = 2.886), compared to the pretest mean score of 34.87 (SD = 2.334). The calculated paired t-test value of -14.149 exceeded the critical value of ±2.045, indicating a statistically significant improvement in QoL following the wellness intervention program. No significant association was found between QoL and variables such as marital status, nature of admission to the old age home, duration of stay, or participation in social activities.

Conclusion

The study demonstrated a significant improvement in the quality of life among elderly residents following the wellness intervention program. Most participants showed a shift from moderate or low QoL in the pretest to high or moderate levels in the posttest. These findings highlight the positive impact of structured wellness programs on enhancing well-being in institutionalized elderly populations.

Keywords: Health, Quality of life, Wellness intervention program, Elderly population

EFFECT OF DIGITAL BALANCE PROGRAMME ON LEVEL OF KNOWLEDGE AND PRACTICE AMONG PARENTS OF PRESCHOOL CHILDREN REGARDING SCREEN TIME EXPOSURE

Nambadan Jasmine Jose[1], Tresa Anto[2], Rati Santhakumar[3]

[1]Msc Nursing student, [2]Dept. of Child health Nursing, JMCON,
[3]Dept. of Pediatrics, JMMC & RI

Background

Excessive screen time exposure among preschool children has been linked to developmental, behavioral, and physical health issues. Parents play a crucial role in regulating and guiding their child's screen use habits. Educating parents through structured interventions like digital balance programmes can significantly improve their knowledge and practical strategies for managing screen time effectively.

Aim

To assess the effectiveness of digital balance programme on the level of knowledge and practice among parents of preschool children regarding screen time exposure.

Objectives

- To assess the level of knowledge and practice among parents of preschool children regarding screen time exposure before and after digital balance programme.
- To find the effect of digital balance programme on level of knowledge and practice among parents of preschool children regarding screen time exposure.
- To determine the association between pre-test knowledge and practice levels with selected socio-demographic variables of the parents.

Methodology

A pre-experimental one-group pre-test post-test design was adopted for the study. A total of 35 parents of preschool children were selected using non-probability convenience sampling. Data were collected using structured questionnaires to

assess knowledge and practice regarding screen time exposure. Following the pre-test, a Digital Balance Programme was administered. A group discussion was conducted one week later, and the post-test assessment was carried out 10 days after the intervention.

Result

In the study, 19 (54.3%) of participants were aged 23–33 years, and 16 (45.7 %) were between 33–43 years. Among the children, 26 (74.3%) were 3 years old, and 9 (25.7%) were aged 4–5 years. More than half of the mothers ie 18 mothers (51.4%) were homemakers, while 17(48.6%) were employed in the private sector. The majority of fathers ie 30 fathers (85.7%) worked in private jobs, and 4 (11.4%) were involved in business. Over half the children (54.3%) were exposed to screen time before the age of 2. The post-test mean knowledge score (18.77 ± 2.798) was significantly higher than the pre-test score (12.43 ± 2.993), $p<0.001$. Similarly, the mean practice score increased from 26.80 (±4.122) in the pre-test to 51.34 (±4.331) in the post-test, $p<0.001$. Average daily screen time reduced from 127.34 (±92.54) minutes to 58.85 (±25.93) minutes after the intervention. No significant association was found between knowledge or practice levels and selected socio-demographic variables.

Conclusion

The Digital Balance Programme proved effective in enhancing both knowledge and practice among parents of preschool children regarding screen time exposure. The significant improvement in post-test scores indicates increased awareness and behavioral changes following the intervention. These findings highlight the importance of structured parental education in promoting healthier digital habits for young children.

Keywords: Digital balance programme, screen time, preschool children, parents, knowledge, practice

PEDIATRIC ADEM: A THREE-YEAR RETROSPECTIVE STUDY OF CLINICAL MANIFESTATIONS, MRI FINDINGS, MOG/NMO STATUS, AND TREATMENT RESPONSE

Byma Benny[1], Vishnu Gopal[1], Rati Santhakumar[2], Sanjeev Kumar TM[2], Rose Xavier[2], Gibi George[2]

[1]Medical Interns, [2]Department of Pediatrics, JMMC & RI

Background

Acute Disseminated Encephalomyelitis (ADEM) is a monophasic, immune-mediated demyelinating disorder of the central nervous system, predominantly affecting children. It often follows a post infectious prodrome and presents with a wide spectrum of neurological manifestations. Neuroimaging, cerebrospinal fluid (CSF) analysis, and serological markers like MOG and NMO antibodies play a crucial role in diagnosis and predicting outcomes.

Aim

To describe the clinical, radiological, and immunological profile of pediatric ADEM cases and evaluate treatment outcomes with corticosteroids and intravenous immunoglobulin (IVIG).

Objectives

- To analyze the clinical presentations, MRI features, and MOG/NMO antibody status in pediatric patients diagnosed with ADEM.
- To evaluate treatment responses to high-dose corticosteroids and IVIG, and correlate them with immunological markers and radiological outcomes.

Methodology

This retrospective observational study was conducted at Jubilee Mission Medical College and Research Institute between April 2022 and April 2025. Ten pediatric patients diagnosed with ADEM, aged 2 to 15 years (M:F ratio 3:2), were included. Data were collected on clinical presentations, prodromal

symptoms, CSF findings, MOG and NMO antibody status (assessed using immunofluorescence assay), MRI findings, treatment approaches, and short-term outcomes for analysis.

Results

Fever and myalgia were present in 90% of cases, with 80% reporting a preceding viral-like illness. Neurological features included myalgia (80%), headache (50%), seizures (30%), altered behavior (30%), meningismus (30%), focal deficits (50%), and bilateral optic neuritis (20%). CSF analysis revealed elevated protein in 30% and lymphocytic pleocytosis in 50% of patients. MOG/NMO antibody positivity was observed in 40%—half at initial presentation and half during a relapsing course.

MRI at presentation revealed multiple, asymmetrical, poorly demarcated T2/FLAIR hyperintense lesions involving both white and grey matter in all cases. Follow-up imaging within two weeks showed radiological improvement in 60%.
Treatment with high-dose intravenous corticosteroids resulted in clinical improvement in 40%, while 50% required additional IVIG (2 g/kg). One patient, requiring ventilator support, was referred to a higher center. At four-week follow-up, 60% had full motor recovery, and 40% showed residual neurological deficits.

Conclusion

Pediatric ADEM is characterized by diverse neurological symptoms, often preceded by a viral-like illness. Diagnostic support from MRI, CSF analysis, and MOG/NMO antibody testing is essential for early recognition and prognostication. Although most patients respond to high-dose corticosteroids, adjunctive IVIG is beneficial in select cases. Early identification and individualized immunotherapy, especially in seropositive patients, can significantly improve outcomes and reduce long-term neurological deficits.

Keywords: ADEM, MOG/NMO Antibodies, Pediatric, IVIG, MRI, Corticosteroids

CLINICAL SPECTRUM AND OUTCOMES OF KAWASAKI DISEASE IN A TERTIARY CARE CENTER

Vishnu Gopal[1], Byma Benny[1], Rati Santhakumar[2], Sanjeev Kumar[2], Gibi George[2], Rose Xavier[2]

[1]Medical Interns, [2]Department of Pediatrics, JMMC & RI

Background

Kawasaki Disease (KD) is an acute, self-limited vasculitis predominantly affecting children under five years of age. It remains the leading cause of acquired heart disease in children in developed countries. Despite diagnostic criteria established by the American Heart Association, KD continues to present diagnostic challenges due to its variable clinical manifestations.

Objective

To describe the clinical features, laboratory profiles, treatment responses, and short-term outcomes of children diagnosed with KD at a tertiary care hospital, emphasizing the importance of early recognition and management.

Methods

This retrospective case series analyzed 10 pediatric patients diagnosed with KD at Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, between May 20th 2022 and May 25th 2025. Medical records were reviewed for demographic data, presenting symptoms, laboratory parameters, echocardiographic findings, treatment modalities, and clinical outcomes.

Results

The study included 10 patients with a mean age of 3.4 years (range: 11 months to 12 years) and a male-to-female ratio of 1:1. All patients presented with fever lasting ≥5 days (100%). Common clinical features included mucosal changes and rash (100%), conjunctival injection (90%), cervical lymphadenopathy (80%), and extremity changes (60%).

Laboratory findings revealed elevated ESR and CRP in all cases. Thrombocytosis was noted in 80% and leukocytosis in 50% during hospitalization. Echocardiography at diagnosis showed coronary artery abnormalities in 20% of patients. All were treated with a single dose of intravenous immunoglobulin (2 g/kg) and high-dose aspirin. There were no cases of IVIG resistance or mortality, and coronary abnormalities resolved post-treatment.

Conclusion

This study highlights the diverse clinical presentation of Kawasaki Disease, emphasizing the importance of early recognition and treatment. Timely administration of IVIG was effective in preventing coronary complications in all cases. The findings reinforce the need for a high index of suspicion in children with prolonged fever and systemic inflammation, even when complete diagnostic criteria are not met. Effective management requires multidisciplinary coordination and ongoing echocardiographic monitoring to ensure favorable outcomes.

Keywords: Kawasaki Disease, Pediatric Vasculitis, Intravenous Immunoglobulin Therapy

COMPARATIVE ANALYSIS OF PLATELET INDICES AMONG NON-PREGNANT WOMEN, HEALTHY PREGNANT WOMEN, AND PREGNANT WOMEN WITH PREECLAMPSIA

Ayswarya Vinod[1], Akshaya R[1,] Aboobacker Mohamed Rafi[1], Athira Sashidharan[1], Ramesh Bhaskaran[1],Usha Shenoy[2], Nithya M Baiju[3]

[1]Dept of Immunohematology & Blood Transfusion,
[2]Dept of Anesthesiology, JMMC & RI, [3]Dept of IHBT, GMC Thrissur

Background

Pregnancy induces physiological alterations in the hemostatic system, characterized by enhanced coagulation, reduced fibrinolysis, and decreased anticoagulant activity, contributing to a hypercoagulable state. This adaptation prevents hemorrhage during placental separation. However, in pathological pregnancies such as preeclampsia (PE), this hypercoagulability is further exaggerated, leading to significant hematological changes. Platelet indices—including platelet count (PC), mean platelet volume (MPV), and plateletcrit (PCT)—are known to reflect platelet activation and consumption. This study aims to compare these indices among non-pregnant women, healthy pregnant women, and women with preeclampsia to identify hematological deviations associated with pregnancy and its complications.

Objectives

- To evaluate and compare platelet parameters (PC, MPV, and PCT) across three groups: non-pregnant women, healthy pregnant women, and pregnant women with preeclampsia.
- To determine the clinical relevance of hematological variations for the early recognition and management of pregnancy-related hypertensive disorders.

Methodology

A retrospective cross-sectional study was conducted over six months in the Department of Immunohematology and Blood Transfusion, Jubilee Mission Medical College and

Research Institute. Laboratory data of 270 participants were analyzed, comprising 90 non-pregnant women, 90 healthy pregnant women, and 90 preeclamptic women. Statistical analysis was performed using Welch's t-test to assess intergroup differences in platelet indices.

Results

Pregnancy was associated with significant hematological changes. Compared to non-pregnant controls, healthy pregnant women exhibited significantly lower PC ($t = -5.113$, $p \approx 0.00000184$) and PCT ($t \approx -3.68$, $p \approx 0.00032$), alongside elevated MPV ($t \approx 11.48$, $p < 0.0001$). When comparing healthy pregnant women to those with preeclampsia, preeclamptic patients demonstrated further reductions in PC ($t = 6.809$, $p \approx 1.20 \times 10^{-9}$) and significantly increased MPV ($t \approx 5.05$, $p < 0.0001$). However, the difference in PCT between these two groups was not statistically significant ($t \approx 1.26$, $p \approx 0.21$).

Conclusion

This study highlighted that pregnancy induced significant alterations in platelet indices, with further exacerbation in preeclampsia. PC and PCT were markedly reduced in pregnant women, particularly in those with preeclampsia. MPV showed a consistent and significant rise, suggesting enhanced platelet activation and turnover. The findings supported the utility of platelet indices—especially MPV and PC—as adjunctive hematological markers for the early detection and monitoring of hypertensive disorders in pregnancy. Routine evaluation of these parameters was suggested to aid in risk stratification and improve clinical outcomes in obstetric care.

Keywords: Platelet index, Preeclampsia, Pregnancy, Hypercoagulability

ENHANCING TRANSFUSION SAFETY IN CENTRAL KERALA: A RETROSPECTIVE ANALYSIS OF AN IMMUNOHEMATOLOGY REFERRAL TESTING CENTRE'S IMPACT

Akshaya R, Junith Thomas, Athira Sasidharan,
Aboobacker Mohamed Rafi, Ramesh Bhaskaran
Dept of Immunohematology & Blood Transfusion, JMMC & RI

Background

Safe blood transfusion relies on accurate immune-hematological testing, including blood group confirmation and antibody identification. In rural and suburban India, blood centers often lack resources for complex cases. The Referral Testing Centre (RTC) at Jubilee Mission Medical College, in collaboration with Quidel Ortho, uses automated platforms (e.g., Ortho Vision®) to resolve discrepancies, manage hemolytic disease of the fetus and newborn (HDFN), and enhance transfusion safety through standardized protocols and education.

Objectives

To assess the RTC's clinical and operational impact on immune-hematological challenges, focusing on:

- Prevalence and specificity of red cell alloantibodies.
- Frequency, causes, and resolution of ABO/Rh discrepancies.
- Clinical impact of prenatal immunohematology referrals.

Methodology

This retrospective observational study was conducted over a period from April 2022 to April 2025 at the Dept of Immunohematology and Blood Transfusion, JMMC &RI. The study involved referred samples from various hospitals across Kerala for advanced immunohematology workup. Testing was performed using automated platforms, Column Agglutination Technology (Ortho BioVue cards), Surgiscreen (3-cell panel), Resolve Panel A (11-cell panel), and various antisera. Statistical analysis was carried out to evaluate antibody frequencies, resolve discrepancies, and establish clinical correlations.

Result

Over the study period, 284 samples were received: 49 (2022), 95 (2023), 112 (2024), and 28 (early 2025). Blood group discrepancies occurred in 69 cases (24.3%): reverse grouping mismatches (32), weak D (25), and rare phenotypes (Bombay: 2; A-subgroups: 3). Antibody screening in 182 cases (64.1%) identified alloantibodies in 137 cases (104 single, 32 multiple), with anti-D (26) and anti-E (13) most common. One case had an unidentified antibody, 11-showed pan-reactivity, and 34 were negative. HDFN investigations (33 cases) focused on ABO incompatibility with maternal antibody titrations, supporting safe transfusion practices. The RTC addressed transfusion challenges in Central Kerala, where advanced immunohematology services were scarce. Blood group discrepancies (24.3%) and alloantibodies (75.3% of screened cases) reflected gaps in peripheral testing. The rise in referrals (from 49 in 2022 to 112 in 2024) highlighted the RTC's growing role. HDFN cases, primarily ABO-related, underscored its impact on maternal-fetal health. Future efforts were recommended to expand referral networks and adopt digital solutions for improved efficiency.

Conclusion

The RTC at Jubilee Mission Medical College enhances transfusion safety by resolving serological issues and managing alloimmunization using automation and standardized protocols. Scaling this model statewide, with ongoing training and policy integration, can bridge India's urban-rural healthcare gap, ensuring equitable access to safe transfusions.

Keywords: Transfusion safety, Immunohematology referral testing, ABO/Rh discrepancies, Red cell alloimmunization, Hemolytic disease of the fetus and newborn (HDFN)

PREOPERATIVE DIAGNOSTIC CHALLENGES OF SPURIOUS HYPOXIA: LESSONS FROM A CASE SERIES ON METHEMOGLOBINEMIA

Pooja Pushparaj, Aboobacker Mohamed Rafi

Dept of Immunohematology & Blood Transfusion, JMMC & RI

Background

Methemoglobinemia is a rare but significant disorder where hemoglobin's iron is oxidized to the ferric (Fe^{3+}) state, impairing its ability to bind and deliver oxygen. This leads to tissue hypoxia despite normal oxygen availability, often presenting as cyanosis and unexplained low oxygen saturation levels. The condition can be congenital, usually due to NADH cytochrome B5 reductase deficiency or abnormal hemoglobin variants, or acquired through exposure to certain drugs or toxins. In preoperative evaluations, undiagnosed methemoglobinemia poses diagnostic and anesthetic challenges. This study aims to highlight the diagnostic complexities and clinical patterns observed in 10 preoperatively detected cases of congenital methemoglobinemia.

Objectives

- To highlight the diagnostic challenges and clinical patterns of methemoglobinemia identified during preoperative evaluations.
- To analyze demographic, clinical, and laboratory findings in 10 cases of congenital methemoglobinemia linked to NADH cytochrome B5 reductase deficiency.

Methodology

A retrospective analysis of ten methemoglobinemia cases was conducted in the Department of Transfusion Medicine & Hematology at JMMC & RI. Blood samples from all patients were subjected to specialized testing at the National Institute of Immunohematology, Mumbai, including assays for NADH cytochrome B5 reductase activity and methemoglobin levels. Clinical, demographic, and laboratory parameters were

reviewed to identify potential triggers, associated underlying conditions, and patient outcomes.

Result

The cohort included 10 patients, which were 5 males and 5 females, ranging from a neonate to a 75-year-old. All were incidentally diagnosed during preoperative assessments for unrelated procedures. Clinical presentations ranged from cyanosis and respiratory distress (70%) to fatigue (20%), giddiness (10%), and headaches (10%). A saturation gap (>5) and persistently low SpO_2 (<85%) despite oxygen therapy were key diagnostic markers, alongside chocolate - colored blood. All the cases were congenital, linked to NADH cytochrome B5 reductase deficiency. Geographic clustering in Palakkad region in Kerala, suggested a potential CYB5R3 gene mutation, warranting further investigation. All patients were started on reducing agents that led to symptomatic and saturation improvement.

Conclusion

This case series underscores the importance of recognizing methemoglobinemia as a cause of spurious hypoxia especially in the preoperative settings. Hallmark features include cyanosis, chocolate-colored blood, and a SpO_2–SaO_2 discrepancy. Early diagnosis and treatment are critical for avoiding complications and for anesthesia management. The predominance of congenital cases and geographic clustering in Palakkad suggest a need for genetic studies to investigate underlying mutations. These findings offer valuable lessons for clinicians managing such patients both in the preoperative and medical settings.

Keywords: Methemoglobinemia, Cytochrome B5 reductase deficiency, Spurious hypoxia, Preoperative evaluation, Pulse oximetry discrepancy, Congenital methemoglobinemia, Diagnostic challenges, Case series

COST EFFECTIVENESS ANALYSIS AND SAFETY OF DAPAGLIFLOZIN VERSUS VILDAGLIPTIN AS ADD ON THERAPY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL

Sarannya Ravi[1], Santosh R Pillai[2], Liya Roslin Joseph[2], Rajeev Philip[2], Tomy Philip[2]

[1]Dept of Pharmacology, JMMC&RI, [2]Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla, Kerala

Background

Type 2 Diabetes Mellitus is a chronic condition demanding life-long treatment. Addition of second-line drugs along with the conventional first-line drugs may be crucial for adequate glycaemic control with the progression of the disease. Therefore, diabetic treatment cost is a challenge to the patient and society. SGLT2 inhibitor Dapagliflozin and DPP-4 inhibitor Vildagliptin are frequently used add-on anti-diabetic drugs. There is limited data regarding the cost-effectiveness analysis and safety assessment among these two drugs. Finding the most cost-effective and safest therapeutic option might decrease the economic burden to the patient and society.

Objective

To evaluate the cost-effectiveness analysis and safety of Dapagliflozin versus Vildagliptin as add-on therapy in patients with Type 2 Diabetes Mellitus

Methodology

This prospective observational study was conducted over one year, involving 80 diabetic patients who met the inclusion criteria. Participants were divided into two groups of 40 each: one group received Dapagliflozin and the other Vildagliptin as add-on therapy. Baseline glycaemic parameters (FBS, PPBS, and HbA1c) were recorded and reassessed after three months of treatment. Direct medical costs incurred by patients were evaluated, and adverse effects in both treatment groups were monitored and documented throughout the study period.

Results

The mean reduction in the glycaemic parameters (FBS, PPBS and HbA1C) were significant in Dapagliflozin treatment group compared to Vildagliptin ($p<0.001$). The total direct medical cost incurred in the Vildagliptin was significantly higher than the Dapagliflozin group ($p<0.005$). The Average Cost Effectiveness Ratio (ACER) calculated for FBS, PPBS and HbA1C values in Dapagliflozin group was lower compared to Vildagliptin. Safety assessment showed hypoglycaemia as the most common adverse drug reaction reported in both the groups. Overall, 16% patients reported adverse effects in Dapagliflozin group and 8% in Vildagliptin group. No serious adverse effects reported in both groups.

Conclusion

Dapagliflozin was the cost-effective drug compared to Vildagliptin as add-on therapy in Type 2 Diabetes Mellitus. Both treatment groups were well-tolerated with a favourable safety profile.

Keywords: Type 2 Diabetes Mellitus, Dapagliflozin, Vildagliptin, Cost-effectiveness analysis

MEDICATION ADHERENCE AND ITS ASSOCIATED FACTORS AMONG STAGE 4 AND 5 CHRONIC KIDNEY DISEASE PATIENTS WHO ARE NOT ON RENAL REPLACEMENT THERAPY IN A TERTIARY CARE CENTER

Josmi Joy [1], Noble Gracious S [2], Sonish S Prabhakaran [3]

[1]Dept of Pharmacology, JMMC & RI, [2]Dept of Nephrology, Govt T D Medical College, Alappuzha, [3]Dept of Pharmacology, Govt Medical College, Thiruvananthapuram

Background

Chronic kidney disease (CKD) is one of the leading causes of mortality around the globe, complicated by numerous underlying comorbidities. Medication adherence is the need of the hour for proper control of the comorbidities, which can thereby delay the progression of CKD to renal replacement therapy. CKD stages 4 and 5 are the critical stages of chronic kidney disease, which cause a heavy pill burden to the patient and pose the risk of impending renal replacement therapies. WHO had described five factors/dimensions that affect medication adherence: patient-related, disease-related, therapy-related, health care system-related, and social & economic factors. Analysing the various factors that pave the way for medication non-adherence could provide insight into the measures we have to adopt for improving medication intake by the patient.

Objective

To evaluate medication adherence and identify factors affecting medication adherence in stage 4 and 5 chronic kidney disease patients not on renal replacement therapy, attending the Nephrology OPD in a tertiary care center.

Methodology

A hospital-based cross-sectional study was conducted in 210 CKD patients diagnosed with Stage 4 and 5 who attended the Nephrology OPD of Government Medical College, Thiruvananthapuram. Patients meeting the inclusion criteria

were interviewed while they came for routine follow-up in the Nephrology OPD. Various factors affecting medication adherence were noted in the proforma from the patient case diary and by patient interview. Adherence to the medication was assessed using the Malayalam version of the 9-item Hill Bone Medication Adherence Scale on the day of the visit.

Result

The study participants included 60.9% of Stage 4 CKD patients and 39.1% of Stage 5 CKD patients. Medication adherence among the study participants was found to be 87.6%. A higher percentage of medication non-adherences were found in stage 5 CKD patients (14.6%) when compared to stage 4 CKD patients (10.9%). Skipping drugs due to the side effects experienced, more than 2 comorbidities, medication administration by self/caregiver, number of medicines per day and pill burden per day, dietary modification and difficulty in drug access were found to be significantly associated with medication non-adherence. Univariate and multivariate analyses also established the independent influence of these factors on medication non-adherence.

Conclusion

A multitude of factors were assessed to uncover the effect on medication adherence, and various factors were found to affect medication adherence. Identifying the factors that affect medication adherence could pave the way for better patient management strategies, which will in turn improve the quality of life of CKD patients.

Keywords: Chronic Kidney Disease, CKD Stage 4 and 5, Medication Adherence, Medication, Non-Adherence

A CROSS SECTIONAL STUDY ON THE HEALTH EFFECTS OF TRAFFIC NOISE AMONG ADULTS OF URBAN AREAS IN THRISSUR DISTRICT

Alina Mary James[1], C.R Saju[2], Sruthi C M[2]

[1]Dept of Community Medicine, JMMC & RI
[2]Dept of Community Medicine, Amala Institute of Medical Sciences, Thrissur

Background

Traffic noise is a growing environmental concern in urban areas, often overlooked despite its significant impact on public health. Prolonged exposure to high noise levels can lead to both auditory problems like hearing loss and non-auditory effects such as sleep disturbances, stress, and cardiovascular issues. This study investigates the extent of traffic noise exposure and its health effects among adults residing in urban areas of Thrissur district.

Aim

To study the effect of traffic noise on health of adult pollution in urban areas of Thrissur District.

Objectives

- The study was done to assess the traffic noise in urban areas of Thrissur district and the auditory and non-auditory effects of noise in these areas.
- The study also determines the association between traffic noise and health effects studied.

Methodology

The traffic noise was measured from 15 junctions across Thrissur District using a calibrated sound level meter. The junctions were chosen after consulting with the traffic police department and the Pollution Control Board. From each of the junction 15 study subjects were randomly selected, totaling to 225 study subjects and a structured questionnaire was used for data collection as per the inclusion and exclusion criteria. Data

was entered in Excel and analysed in SPSS version 23 using descriptive statistics, Chi square test and Binomial Logistic regression.

Results

The measured noise levels, expressed as Leq, ranged from 67.7 to 79.2 dBA, with the highest level recorded at Ambakkadan Junction. Among the 225 study participants, 60% were exposed to high noise levels, and 47.1% reported dissatisfaction with the traffic noise in their surroundings.

Conclusion:

The traffic noise levels recorded in the study exceeded the permissible limits set by the Government of India. Significant associations were observed between noise exposure and both auditory and non-auditory health effects. Strengthening the enforcement of noise regulation laws, implementing effective mitigation strategies, and conducting regular health screening for individuals living near high-traffic areas are essential steps to address this public health concern.

Keywords: Traffic noise, health effects, urban areas, Thrissur district

MORBIDITY PROFILE AND HEALTH-SEEKING BEHAVIOUR OF THE CATHOLIC PRIESTS IN BANGALORE INDIA: A CROSS-SECTIONAL STUDY

Jobin George[1], Bobby Joseph[2]

[1]Dept of Community Health, JMMC & RI
[2]Dept of Community Health, St John's Medical College, Bengaluru

Background

Catholic priests often lead demanding lives involving spiritual, pastoral, and administrative responsibilities, which may influence their physical and mental well-being. Understanding their health status and healthcare utilization is essential for ensuring their overall welfare and effective service.

Objectives

- To identify the morbidity profile and associated factors among Catholic priests in the Bangalore region (including Bengaluru Urban, Bengaluru Rural, Chikkaballapura, Kolara, Ramanagara, and Tumakuru districts).
- To describe the health-seeking behaviour and the factors influencing it among Catholic priests in the same region.

Methods

Universal sampling was used to include all eligible Catholic priests from institutions that provided formal permission through an authorized request letter signed by their superiors. Thus, a total of 190 priests from the Bangalore region participated in the study. Data were collected using a semi-structured interview schedule covering socio-demographic information, health status, and health-seeking behaviour, along with validated tools such as the DASS-21, Nordic Musculoskeletal Questionnaire, and findings from a general physical examination.

Results

The study included 190 Catholic priests from Bangalore, with a mean age of 46.93 ± 12.94 years and an average of 23.4 ± 3.06 years of education. Their roles were distributed

across academic (35.3%), administrative (30.0%), and pastoral (34.7%) activities. A high prevalence of obesity (64.7%) and prehypertension (64.7%) was noted, while 96.8% had normal blood sugar levels. Most participants were physically active (91.6%) and consumed a non-vegetarian diet (96.3%). Common infectious diseases reported were chickenpox (58%) and COVID-19 (40%), while prevalent non-communicable diseases included hypertension (15.8%), dyslipidaemia (14.2%), and diabetes (11.1%). Musculoskeletal complaints were mainly in the neck (12.1%), knees (11.6%), and lower back (9.4%). Psychological health was generally good, with over 88% scoring in the normal range on the DASS-21 scale. Regarding health-seeking behaviour, most participants preferred allopathic care for chronic conditions and adhered to treatment, though routine checkups were typically prompted by individual health needs.

Conclusion

The study highlights notable health concerns among Catholic priests in the Bangalore region, including a high prevalence of obesity, prehypertension, and musculoskeletal issues. These findings underscore the need for targeted health interventions focused on promoting physical well-being and improving proactive healthcare-seeking behaviour within this population.

Keywords: Catholic priests, health-seeking behaviour, morbidity

ASSESSMENT OF MEDICATION-RELATED PROBLEMS IN PATIENTS WITH CHRONIC LIVER DISEASE: A CROSS-SECTIONAL STUDY AT A TERTIARY CARE HOSPITAL

Rohan A[1], Kavitha Rajaratna[2]

[1]Dept of Pharmacology, JMMC & RI, [2]Dept of pharmacology, Bangalore Medical College, Bengaluru, Karnataka

Background

Chronic liver disease (CLD) is defined as hepatic injury, inflammation and/or fibrosis occurring in the liver for more than 6 months. Medication-related problems, or MRPs for short, are described as drug-related events or situations that get in the way of desired health outcomes. MRPs in cirrhosis include non-adherence, adverse drug reactions, drug-drug and drug disease interactions. Objectives: To assess the medication related problems in patients with CLD in terms of pattern of pharmacotherapy and frequency of polypharmacy (>5 drugs), ADRs, medication adherence, drug-drug interaction.

Methodology

This cross-sectional study (August 2022-January 2024) was conducted at Bangalore Medical College and Research Institute to assess the medication related problems among patients with CLD. Patients diagnosed with CLD and on treatment for 6 months were included. After obtaining informed consent, detailed demographic, disease and drug data was collected and recorded in the case record form. Medication adherence was assessed using a validated MARS-5 Questionnaire. The adverse drug reactions (ADRs) were recorded using CDSCO form. Potential drug-drug interactions (pDDI) were analysed using Lexicomp software.

Results

A total of 100 patients with CLD participated and completed the questionnaire. The mean age was 47.09 ± 10.58 years. Polypharmacy was prevalent in 8% of patients on home

medications. After admission all the patients had polypharmacy. 55% of the patients were adherent. Patients with diabetes mellitus (p=0.004) and hepatorenal syndrome (p=0.032) were significantly more adherent. The frequency of ADR was 62%. The most common ADRs encountered were vomiting (13) and decreased urine output (12). A total of 954 drugs were prescribed and 64 pDDI combinations were identified using Lexicomp software. Among these pDDI, 47% had category A with no known drug interactions, 44% had category C that required monitoring of therapy.

Conclusion

Majority of patients with CLD were males, which was attributed to increased alcohol consumption among males. Patients who were admitted were put on an average of ten drugs. The pattern of pharmacotherapy indicated that majority of drugs were for hepatic dysfunction and gastritis. ADRs were mainly of the gastrointestinal and renal systems. Majority of potential drug-drug interactions were requiring monitoring.

Keywords: Medication related problems, pDDI

COMPUTATIONAL INVESTIGATION OF THE CROSSTALK BETWEEN ACHE AND NEUREXIN-1B: EXPLORING THE NON-CATALYTIC FUNCTIONS OF ACHE

Chandran Remya, K.V. Dileep

Laboratory for Computational and Structural Biology, JCMR

Background

Early stages of neurodegenerative diseases such as Alzheimer's disease (AD) are marked by progressive synaptic loss in the cortex and hippocampus. Synaptic development and stability rely heavily on the interaction between neurexins and neuroligins, the transmembrane proteins located on the pre- and post-synaptic membranes, respectively. These proteins connect through their ectodomains to form trans-synaptic junctions and interact via their cytoplasmic tails with PDZ-domain scaffolding proteins to promote synaptic adhesion and organization. Prior studies have shown that overexpression of acetylcholinesterase (AChE), an enzyme responsible for terminating cholinergic neurotransmission, leads to reduced expression of neurexins and neuroligins, resulting in diminished glutamatergic synapses. Interestingly, neuroligin's ectodomains share structural similarities with AChE.

Aim and objective

To investigate the potential interaction between AChE and Neurexin-1β and to explore the non-catalytic role of AChE in synaptic regulation.

Methodology

Protein-protein docking was used to model the interaction between AChE and Neurexin-1β, followed by molecular dynamics (MD) simulations to evaluate the stability of the docked complexes. Key binding residues were identified using per-residue energy decomposition and *in silico* alanine scanning mutagenesis.

Results

The computational analysis revealed that Neurexin-1β can bind to AChE in a manner similar to the Neurexin–Neuroligin complex. This binding may competitively interfere with the native Neurexin–Neuroligin interactions, potentially compromising trans-synaptic adhesion and glutamatergic synapse integrity. Key interface residues contributing to the binding were identified and characterized.

Conclusion

The study provides molecular insights into how AChE overexpression might disrupt synaptic architecture by interacting with Neurexin-1β. These findings highlight a possible non-catalytic function of AChE in synapse modulation, contributing to synaptic loss in early AD.

Keywords: NRX; AChE; neuroligins; Docking; Molecular dynamics

IN VITRO & *IN -SILICO* EVALUATION OF ANTIBACTERIAL ACTIVITY OF AMRUTHOTHARAM KASHAYAM AGAINST *ENTEROCOCCUS FAECALIS*

Vidya R Nair[1], Dileep Vijayan[1], Chithra Valsan[2]

[1]Laboratory for Computational and Structural Biology, JCMR, [2] Department of Microbiology, JMMC&RI

Background

Enterococcus faecalis is a resilient pathogen often implicated in antibiotic-resistant infections, posing a significant challenge to modern medicine. Traditional Ayurvedic formulations like Amruthotharam kashayam have long been used for their therapeutic properties, including potential antimicrobial effects.

Aim

The study aims to evaluate the potential efficacy of the selected Ayurvedic formulation against Enterococcus bacterial strains, providing insights into its antimicrobial properties and therapeutic applicability through *in-vitro* and *in-silico* methods.

Methodology

The antimicrobial activity of the Ayurvedic formulation Amrithotharam Kashayam (AK) was initially assessed using standard in vitro methods. The disk diffusion assay involved placing sterile filter paper disks impregnated with the formulation onto Mueller-Hinton agar plates seeded with *Enterococcus faecalis*. After incubation, zones of inhibition were measured to evaluate the ability of the formulation to suppress bacterial growth. As a complementary approach, the agar well diffusion method was employed to assess the antimicrobial potential of the liquid formulation more effectively. Wells were created in agar plates pre-inoculated with *E. faecalis*, and varying volumes of AK were introduced into the wells. Following incubation, the diameter of the inhibition zones was recorded. To elucidate the bioactive constituents responsible for the observed antibacterial effects,

GC-MS analysis was conducted. The identified compounds were then subjected to *in-silico* molecular docking studies to predict their interaction with essential bacterial protein targets of *E. faecalis*. The docking simulations were performed using the Schrödinger Maestro platform, facilitating the assessment of binding affinities and interaction profiles.

Results

AK exhibited dose-dependent antibacterial activity against *Enterococcus faecalis* in both disk and agar well diffusion assays. In the disk method, inhibition zones increased with concentration, reaching up to 12 mm at 100 µL. The agar well diffusion showed slightly larger zones (up to 14 mm), likely due to improved diffusion from the wells. These findings confirm the antimicrobial potential of AK against *E. faecalis*.

To explore the active compounds responsible, 435 phytochemicals (429 from literature and 6 from GC-MS) were docked against validated *E. faecalis* targets using Schrödinger Maestro. Ligands were filtered based on binding energy and desirability scores. From this, 63 compounds met the energy threshold, and 44 were identified as potential leads for further analysis. These results support the in vitro findings and suggest plausible mechanisms for AK's antibacterial activity.

Discussion

The study confirms the antibacterial potential of AK against *Enterococcus faecalis*, with both disk and well diffusion assays showing concentration-dependent inhibition. Slightly larger zones in the well diffusion method suggest better diffusion and contact of the formulation with the medium. The *in-silico* docking results support these findings, identifying 44 phytocompounds with strong binding affinities to key bacterial targets. Together, the in vitro and computational data suggest that AK contains active constituents capable of inhibiting *E. faecalis*, warranting further investigation for therapeutic applications.

Keywords: Enterococcus, Ayurveda, Anti-bacterial

BRIDGING THE GAP BETWEEN TRADITIONAL WISDOM AND CLINICAL EVIDENCE: THE ROLE OF CLINICAL TRIALS IN NATURAL PRODUCT DRUG DEVELOPMENT

Akash Prakash, Mathew John

Biochemistry & Phytochemistry Research Department, JCMR

Background

Natural products have historically contributed to drug discovery, offering diverse bioactive compounds with therapeutic potential. However, many remain underutilized due to limited clinical validation.

Objectives

This study aims to underscore the importance of clinical trials in substantiating the pharmacological efficacy and safety of natural compounds, facilitating their integration into mainstream medicine.

Methods

A comprehensive review of the literature was conducted using databases including PubMed, Scopus, ClinicalTrials.gov, and the Cochrane Library. A total of 186 peer-reviewed papers and clinical trial records published between 2010 and 2024 were analyzed. The progression of selected natural products through Phase I–III clinical trials was evaluated. Key challenges such as standardization of extracts, variability in bioavailability, and trial design limitations were also examined.

Results

The findings reveal a growing number of natural product-based interventions undergoing clinical evaluation, particularly in oncology, infectious diseases, and inflammatory conditions. Several compounds demonstrated promising safety profiles and therapeutic efficacy. Nonetheless, translational gaps persist due to inconsistencies in compound characterization, lack of standardized dosing protocols, and regulatory challenges.

Conclusion

Clinical trials play a pivotal role in validating the pharmacological promise of nature-derived therapeutics. A multidisciplinary approach that integrates pharmacognosy, clinical pharmacology, biotechnology, and regulatory science is essential to advance these compounds from bench to bedside and ensure their successful integration into evidence-based medicine.

Keywords: Natural products, Clinical trials, Drug development, Pharmacological validation, Traditional medicine, Evidence-based integration

A COMPARATIVE EVALUATION OF OXIDATIVE STRESS IN LARGE VESSEL AND SMALL VESSEL OCCLUSION VARIANTS OF ISCHEMIC STROKE

Keerthana P V[1,2], Mathew John[1], Shilly Elizabeth David [1,2]

[1]Biochemistry and Phytochemistry Research Division, JCMR,
[2]Mar Thoma College, Tiruvalla

Background

Stroke, or cerebrovascular accident (CVA), is a sudden onset neurological impairment caused by vascular injury within the central nervous system. It ranks as the third leading cause of death and disability worldwide, following heart disease, based on the 2025 World Stroke Organization Global Stroke Fact Sheet. Ischemic stroke, the most common subtype, occurs due to obstruction in cerebral blood flow and is classified into large vessel occlusion (LVO) and small vessel occlusion (SVO). Oxidative stress is a major factor contributing to neuronal damage in stroke, resulting from an overproduction of reactive oxygen species (ROS) and insufficient antioxidant defense mechanisms. Key biomarkers of oxidative stress include elevated malondialdehyde (MDA), indicating lipid peroxidation, and changes in antioxidant enzymes such as superoxide dismutase (SOD) and catalase. Comparative analysis of these markers in ischemic stroke variants and healthy controls may help elucidate underlying pathophysiological differences and support the development of targeted therapeutic strategies.

Aim

To evaluate the redox status in large vessel and small vessel occlusion variants of Ischemic Stroke.

Objective

- To compare and evaluate the lipid peroxidation status between LVO and SVO occlusion variants of Ischemic Stroke
- To compare and evaluate the antioxidant enzyme activity between LVO & SVO variants of Ischemic Stroke

Methodology

A comparative cross-sectional study was conducted at a tertiary care hospital with institutional ethics approval. Peripheral blood (3 mL) was collected in EDTA tubes from acute ischemic stroke (AIS) patients and healthy controls. Clinical evaluation and classification of stroke subtypes LVO and SVO were performed by a consultant neurologist using CT and MRI findings. Plasma was separated, stored at −80°C, and redox status was evaluated in 15 participants per group. Oxidative stress markers were evaluated by measuring plasma MDA levels using the TBARS assay, SOD activity with the pyrogallol autoxidation method, and catalase activity by the colorimetric Hadwan method. Data were statistically analyzed and compared.

Result

Plasma oxidative stress markers showed significant alterations in ischemic stroke patients compared to healthy controls. SOD and catalase activities were modestly decreased in both LVO and SVO, with a more pronounced reduction in LVO, indicating impaired antioxidant defenses. MDA levels, a marker of lipid peroxidation, were elevated in both stroke subtypes, particularly in LVO, suggesting heightened oxidative stress and cellular damage. These findings indicate a disrupted redox balance, with LVO experiencing greater oxidative burden.

Conclusion

The study highlights the critical role of oxidative stress in ischemic stroke pathophysiology. The observed increase in MDA and decrease in antioxidant enzymes (SOD and catalase) reflect redox imbalance contributing to neuronal damage and poor outcomes, particularly in large vessel occlusion. These biomarkers may serve as indicators of disease severity and potential targets for antioxidant-based interventions in ischemic stroke.

Keywords: Acute Ischemic Stroke, Large Vessel, Small Vessel, Malondialdehyde, Superoxide Dismutase

ANALYZING THE ROLE OF *CYB5A* POLYMORPHISMS IN POLYCYSTIC OVARY SYNDROME

Mary Martin[1,2], Rema L P[1], Roger Francis[2,3], Jijo Francis[2,4], Neetha George[5], Sareena Gilvaz[5], Suresh Kumar R[2]

[1]Maharaja's College (Government- Autonomous), Ernakulam, Kerala
[2]Cytogenetics and Genomics Laboratory, JCMR
[3]Nirmala College for Women (Autonomous), Coimbatore, Tamil Nadu
[4]Christ College (Autonomous), Irinjalakuda, Kerala
[5]Department of Obstetrics and Gynaecology, JMMC & RI

Background

Polycystic ovary syndrome (PCOS) is a prevalent endocrine and inflammatory disorder that impacts 11.33% of women who are of reproductive age and exhibit hyperandrogenism, oligoovulation, and polycystic ovaries on ultrasound. Individuals with PCOS often experience associated conditions such as infertility, hyperlipidemia, insulin resistance, cardiovascular risks, obesity, and psychological challenges. One key biochemical hallmark of PCOS is hyperandrogenism, suggesting a potential link with genes involved in steroid hormone biosynthesis and metabolism. *CYB5A* (cytochrome b5 type A) encodes a heme-binding protein that acts as an essential electron donor to enzymes like CYP17A1, modulating the 17,20-lyase activity critical for androgen production. Disruption in this electron transfer mechanism may affect androgen synthesis, thereby contributing to the hyperandrogenic phenotype of PCOS. Single-nucleotide polymorphisms (SNPs) within the *CYB5A* gene, such as rs1790834 and rs1790858, may influence gene expression or enzyme function, possibly altering steroidogenesis and metabolic pathways implicated in PCOS. However, there are no studies that investigated the association of *CYB5A* polymorphisms with PCOS.

Aim

To analyze the role of *CYB5A* polymorphisms (rs1790834, rs1790858) in polycystic ovary syndrome.

Objectives

- To analyze the allele frequency and genotype frequency of *CYB5A* rs1790834 & rs1790858 polymorphisms in PCOS patients and healthy controls.
- To analyze the association of *CYB5A* polymorphisms (rs1790834 & rs1790858) and PCOS.

Methodology

We recruited 150 controls and 150 PCOS patients based on Rotterdam criteria. Genomic DNA was extracted from the samples, followed by PCR-RFLP. RFLP was done using the enzyme BccI in rs1790834 polymorphism and the Taq I enzyme in rs1790858 polymorphism. Statistical analysis was done using SPSS version 27.

Result

The PCOS and control groups did not differ significantly regarding genotype frequency (p=0.75) and allele frequency (p=0.54) in rs1790834. The PCOS and control groups did not differ significantly regarding genotype frequency (p=0.10) and allele frequency (p = 0.11) in rs1790858.

Conclusion

No association was found between *CYB5A* polymorphisms (rs1790834, rs1790858) and PCOS. This pioneering study from India should be replicated with a larger sample size**.**

Keywords: PCOS, *CYB5A*, rs1790834, rs1790858

INVESTIGATING THE INHIBITORY EFFECTS OF LINALOOL, A SECONDARY METABOLITE OF *ELETTARIA CARDAMOMUM*, AGAINST HUMAN LYSOZYME AGGREGATION

Hima Sree[1,2],D. M. Vasudevan[1,2] and Dileep K.V.[1,2]

[1]Amrita Vishwa Vidyapeetham, Kochi, Kerala
[2]Laboratory for Computational and Structural Biology, JCMR

Background

Amyloidosis refers to a group of protein misfolding disorders marked by extracellular deposition of insoluble amyloid fibrils, leading to organ dysfunction. Systemic hereditary amyloidosis (SHA), a rare autosomal dominant disease, is caused by LYZ gene mutations that promote lysozyme misfolding and fibril deposition. As current treatments are mainly symptomatic, identifying effective aggregation inhibitors is essential. *Elettaria cardamomum*, a medicinal herb with antioxidant and anti-inflammatory properties, contains bioactives that may modulate protein aggregation. This study evaluates the anti-amyloidogenic potential of linalool (LIN), a monoterpene from cardamom, against human lysozyme fibrillation (HLF) using biophysical and computational approaches.

Aim

To evaluate the inhibitory effect of LIN, a bioactive compound from *Elettaria cardamomum*, on HLF using in vitro and in silico approaches.

Objectives

- To induce and characterize amyloid fibrils of human native lysozyme (HNL) under controlled in vitro conditions.
- To evaluate LIN's inhibitory effect on lysozyme fibrillation using biophysical assays including Thioflavin T (ThT), Congo Red (CR), and 8-anilinonaphthalene-1-sulfonic acid (ANS) fluorescence.

- To elucidate LIN-lysozyme binding via molecular docking and molecular dynamics (MD) simulations.

Methodology

HLF were generated by incubating human lysozyme (HNL) in phosphate buffer with NaCl and ethanol at 60 °C for 24 h under agitation (250 rpm). LIN (25–800 μM) was added to assess dose-dependent inhibition. Fibrillation was evaluated using ThT fluorescence (Ex: 440 nm; Em: 460–600 nm), CR absorbance (400–700 nm), and ANS fluorescence (Ex: 380 nm; Em: 400–600 nm). Computational analysis included molecular docking of LIN with lysozyme (PDB ID: 1JSF) using Schrödinger Maestro, followed by 100 ns MD simulations to assess complex stability and interactions.

Result

Biophysical and computational analyses demonstrated that LIN effectively inhibited HLF, ThT and CR assays showed dose-dependent inhibition, with ThT fluorescence reduced by 75–80% at 800 μM LIN and CR indicating decreased absorbance and red shift, confirming reduced fibril content. ANS fluorescence revealed a 76% decrease in hydrophobicity with a slight blue shift at 400 μM, suggesting lower aggregate formation. Molecular docking (PDB ID: 1JSF) showed stable LIN binding (–48.40 kcal/mol) via hydrogen bonds with Q48 and N60 and hydrophobic interactions with I59, Y63, W64, V99, A108, W109, and V110—key residues in aggregation-prone regions. These results suggest LIN stabilizes the native structure and inhibits fibrillation.

Conclusion

This study demonstrated that LIN, a bioactive compound from *Elettaria cardamomum*, effectively inhibited human lysozyme fibrillation in vitro. Biophysical assays showed reduced fibrillation and surface hydrophobicity, in the presence of inhibitor. Molecular docking and dynamics revealed stable LIN binding to aggregation-prone regions via hydrogen bonds

and hydrophobic interactions. These results suggest that LIN stabilizes the lysozyme and prevents misfolding, highlighting its potential as a natural anti-amyloidogenic agent for treating SHA.

Keywords: Human lysozyme, *Elettaria cardamomum*, Amyloid fibrillation, ThT assay, Linalool, Molecular docking.

IN SILICO AND *IN VITRO* EVALUATION OF METHYL EUGENOL AS A THERAPEUTIC CANDIDATE FOR ALZHEIMER'S DISEASE

Aiswarya N[1,2], D M Vasudevan[1,2], K.V. Dileep[1,2]

[1]Laboratory for Computational and Structural Biology, JCMR
[2]Amrita Vishwa Vidyapeetham,AIMS, Kochi.

Background

Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by cognitive decline, amyloid-beta (Aβ) plaque accumulation, neurofibrillary tangles, and neuroinflammation. Oxidative stress, which is closely linked to the activity of monoamine oxidase B (MAO-B), plays a central role in neuronal damage, as MAO-B generates neurotoxic hydrogen peroxide during monoamine metabolism. Targeting MAO-B has thus become a promising strategy for slowing AD progression. Natural compounds have garnered significant interest due to their ability to target multiple disease pathways, offering a multitarget approach to neurodegeneration. In this study, secondary metabolites from *Elettaria cardamomum* were explored using an integrated computational and *in vitro* approach. Among them, methyl eugenol showed strong potential to inhibit MAO-B and acetylcholinesterase (AChE) and protect brain cells from damage caused by Aβ, inflammation, and excitotoxicity.

Aim

To investigate the therapeutic potential of methyl eugenol, as a multitarget-directed agent for
AD through computational and experimental validation.

Objectives

- To identify bioactive phytochemicals from *Elettaria cardamomum* and evaluate the binding affinity and interaction profile of promising candidates, with key AD-

related enzymes MAO-B and AChE using molecular docking and molecular dynamics (MD) simulations.

- To determine the *in vitro* inhibitory activity of the compound against MAO-B and AChE enzymes using enzyme inhibition assays.
- To assess the neuroprotective effects of compound in SH-SY5Y cells under toxic conditions induced by Aβ, LPS, and glutamate.

Methodology

Phytochemicals from Elettaria cardamomum were selected through literature and database screening, and their structures were prepared for virtual screening. Molecular docking was performed to estimate binding affinities, followed by molecular dynamics (MD) simulations using Desmond to assess the stability of ligand–protein complexes. In vitro assays were carried out to determine the inhibitory activity of methyl eugenol against MAO-B and AChE, with IC_{50} values calculated. SH-SY5Y cells were used to evaluate cytotoxicity and neuroprotective effects against Aβ-, LPS-, and glutamate-induced toxicity after treatment with methyl eugenol.

Result

Among 94 cardamom phytochemicals screened, methyl eugenol showed strong binding to MAO-B, with binding energies of –33 kcal/mol (open) and –31 kcal/mol (closed). MD simulations confirmed stable binding, especially in the open form. Methyl eugenol also showed moderate interaction with AChE, with lower binding affinity and higher IC_{50} compared to MAO-B.Despite modest potency, its dual-targeting ability indicated potential for further optimization

Conclusion

Methyl eugenol, identified through virtual screening of cardamom phytochemicals, demonstrates strong and stable binding to MAO-B. Its moderate interaction with AChE, along with significant neuroprotection against Aβ, LPS, and

glutamate-induced toxicity, highlights its multitarget potential. These findings position methyl eugenol as a promising lead for the development of novel therapeutics against AD

Keywords: MAO, AD, Methyl eugenol, Neuroinflammation, Phytochemical

RATIONAL DESIGN OF TP5-DERIVED PEPTIDIC INHIBITORS TARGETING GSK3B MEDIATED TAU PATHOLOGY IN ALZHEIMER'S DISEASE

Chaithanya M [1,2], K.V. Dileep[1,2]

[1]Manipal Academy of Higher Education, Manipal, Karnataka
[2]Laboratory for Computational and Structural Biology, JCMR

Background

Glycogen synthase kinase 3 beta (GSK3β) is a multi-functional serine/threonine kinase critically implicated in tau hyperphosphorylation and neurodegeneration in Alzheimer's disease. Aberrant activation of GSK3β is often associated with pathological interactions with the CDK5–P25 complex. Recent studies have shown that TP5, a peptide derived from the CDK5 activator P35, can inhibit CDK5–P25 activity and offer neuroprotection. Inspired by TP5, this study aims to rationally design novel peptide inhibitors targeting GSK3β, offering a dual approach to modulate pathological signaling in Alzheimer's disease.

Aim

To design, refine, and evaluate TP5-inspired peptide inhibitors that bind to and potentially inhibit GSK3β.

Objective

- Generate and optimize GSK3β–peptide complex structures via flexible docking.
- Identify stabilizing mutations in TP5 to enhance GSK3β binding.
- Assess the binding stability and interaction profile through molecular dynamics.

Methodology

The crystal structure of GSK3β and the CDK5 activator P25 were prepared used Schrödinger's BioLuminate. The TP5 peptide was derived from P25 and refined used HADDOCK protocol to generated low-RMSD binding poses with GSK3β.Systematic mutagenesis was performed on peptide

residues to identified variants with improved binding affinity. The top stabilizing mutations ($\Delta\Delta G < 0$) were ranked based on energy scoring. Final peptide–GSK3β complexes were subjected to 500 ns molecular dynamics simulations to evaluate structural stability and key interactions.

Result

Refinement of the GSK3β–TP5 complex using HADDOCK generated stable docking poses with favorable interaction energies and peptide conformations. Several variants of the TP5 peptide, generated through systematic mutation, demonstrated improved binding characteristics compared to the wild-type sequence. Among these, a subset showered stronger predicted affinity and more stable interactions at the binding interface.

Molecular dynamics simulations confirmed that the top peptide variants maintained structural stability over time and exhibited enhanced interactions with key residues in the GSK3β active site. The binding remained consistent throughout the simulation, indicating potential for effective inhibition. These findings suggested that rationally designed TP5-based peptides can be optimized to improve GSK3β binding, offering promising leads for further development.

Conclusion

This study identifies TP5-derived peptide variants with enhanced GSK3β binding affinity. The designed peptides represent promising leads for the development of neuroprotective therapeutics aimed at modulating GSK3β activity in Alzheimer's disease.

Keywords: GSK3β, TP5, Peptide inhibitor, CDK5-P25, Alzheimer's disease, Tau Hyperphosphorylation

IN SILICO INVESTIGATION OF LYSOZYME AGGREGATION INHIBITION BY DNA APTAMER

Angel Davis[1,2], K.V. Dileep[1,2]

[1]Manipal Academy of Higher Education, Manipal, Karnataka
[2]Laboratory for Computational and Structural Biology, JCMR

Background

Lysozyme, a key component of the innate immune system, is a bacteriolytic enzyme primarily produced by hepatocytes and macrophages. In certain pathological conditions, it can misfold and aggregate, forming amyloid plaques-a key feature of systemic hereditary amyloidosis (SHA). This disease mainly affects the salivary glands, gastrointestinal tract, liver, kidneys, and vasculature, leading to symptoms such as sicca syndrome, diarrhea, and spontaneous bleeding. Currently, there is no established cure for SHA. Therefore, developing effective therapeutic strategies aimed at either blocking amyloid fibrils or clearing amyloid aggregates are highly demanding. Aptamers are short, stable, and low-immunogenic oligonucleotides selected for high-affinity binding, offer several advantages over antibodies. A lysozyme-specific aptamer with a known 3D structure (PDB) has been identified; however, its ability to inhibit lysozyme aggregation remains unexplored. Therefore, in this study, we investigated the efficacy of this aptamer in preventing lysozyme aggregation through in silico analyses.

Aim

To investigate the inhibitory effect of DNA aptamer on lysozyme aggregation

Objective

To evaluate the binding affinity of the aptamer-lysozyme complex through computational modeling.

Methodology

To investigate the inhibitory effect of DNA aptamer, we began by identifying already existing PDB entries of the lysozyme-aptamer complex. To predict the binding affinity of the identified complex, we performed MMGBSA and then converted the identified RNA aptamer to a DNA aptamer using Molecular Operating Environment (MOE) software. We also evaluated whether the aptamer inhibits aggregation by assessing its ability to bind and mask the aggregation-prone regions of lysozyme.

Result

In this study, two RNA aptamers targeting hen egg white lysozyme (PDB IDs: 4M4O and 4M6D) were identified and analyzed for their potential to inhibit lysozyme aggregation. Comparative evaluation revealed that the aptamer corresponding to PDB ID 4M4O exhibited superior binding affinity and greater inhibitory potential against lysozyme's enzymatic activity. Computational analysis, including molecular docking and MMGBSA binding energy calculations, confirmed that the predicted DNA aptamer maintained strong binding interactions with lysozyme, indicating its potential as a therapeutic candidate for lysozyme amyloidosis.

Conclusion

This study demonstrates the potential of a previously known aptamer, targeting hen egg white lysozyme (PDB ID: 4M4O), to inhibit lysozyme aggregation. Our computational findings indicate that the previously reported aptamer holds promise as a therapeutic candidate for preventing lysozyme aggregation. These results provided a strong rationale for further in vitro and in vivo investigations aimed at developing effective interventions for lysozyme amyloidosis.

Keywords: Lysozyme, aptamer, aggregation, DNA, RNA

UNRAVELING THE SPECTRUM OF GENE MUTATIONS IN 46,XY DISORDERS OF SEXUAL DEVELOPMENT USING WHOLE EXOME SEQUENCING

Suresh Kumar Raveendran[1], Sareena Gilvaz[2], Saji KG[1], Lola Ramachandran[2], Saley Daniel[2], Jeff George[1]

[1]Cytogenetics and Genomics Laboratory, JCMR
[2]Department of Obstetrics and Gynaecology, JMMC&RI

Background

Disorders of sex developments (DSDs) are defined as a congenital medical condition with the discordant development of genetic, gonadal and anatomical sex. According to the chromosomal components DSDs are classified into three major groups; 46,XY DSD, 46,XX DSD and sex chromosomal DSD. 46,XY DSD includes conditions where hormone production or action is disrupted or where testicular development is absent or aberrant. Individuals with 46,XY DSD face a range of medical (infertility, hormonal imbalances and gonadal tumours), psychological (gender identity confusion, depression and body image issues), and social challenges. The genetic diagnosis rate for 46,XY DSD is only about 40–50%, suggesting that additional, yet unidentified genes may contribute to its pathogenesis.

Aim

To investigate the involvement of novel genes in the pathogenesis of 46,XY DSD using whole-exome sequencing.

Methodology

Peripheral blood samples were collected from six female individuals suspected of having 46,XY DSD. Classical cytogenetic analysis was conducted using GTG-banding on metaphase chromosomes, and karyotyping was performed in accordance with the International System for Human Cytogenetic Nomenclature (ISCN). Additionally, the promoter and exonic regions of the *SRY* gene were analyzed through PCR

sequencing. To identify potential candidate genes involved in 46,XY DSD, whole exome sequencing and *in silico* analysis were also carried out.

Result

In karyotype analysis, we observed a male karyotype in all the study subjects. In PCR sanger sequencing we identified a novel missense mutation within the HMG domain of *SRY* gene, an A to T transition which causes E89V amino acid substitution in a 15 yr old female patient. Exome sequencing of the three patients identified three missense variants in the genes CYP21A2 (c.1024C>T; p.Arg342Trp), DCC (c.3680G>A; p.Arg1227His), and PTCH2 (c.247G>A; p.Glu83Lys), which may be involved in the pathogenesis of 46,XY DSD. Bioinformatic analysis predicted the CYP21A2 p.Arg342Trp variant to be pathogenic, while the DCC p.Arg1227His and PTCH2 p.Glu83Lys variants were classified as variants of uncertain significance (VUS).

Conclusion

We identified pathogenic missense mutations in *SRY* and CYP21A2, along with two variants of uncertain significance mutations in 46,XY female patients with complete gonadal dysgenesis.

Keywords: Disorders of sexual development, *SRY*, Exome sequencing

FUNCTIONAL IMPACT OF *CYP1B1* MUTATIONS ON ESTROGEN METABOLISM IN UTERINE FIBROID DEVELOPMENT

Saritha Francis[1], Aswath Kumar[2], Dileep K Vijayan[1]

[1] Laboratory for Computational and Structural Biology, JCMR
[2]Department of Obstetrics and Gynecology, JMMC&RI.

Background

Uterine leiomyomas, or fibroids, are the most common pelvic tumors in women of reproductive age, often impairing quality of life, physical activity, and work productivity. Although highly prevalent, their precise etiology remains unclear. Various factors, including genetic alterations, inflammation, cholesterol-derived hormones, and lifestyle, are associated with their development. Among these, reproductive hormones—especially estrogen—play a key role in fibroid growth and progression. Estrogen metabolism is regulated by many enzymes including CYP1B1, which converts estradiol (E2) into the metabolite 4-hydroxyestradiol (4-OHE2). Dysregulation of this pathway may contribute to abnormal estrogen accumulation and fibroid pathogenesis.

Aim

To investigate the impact of *CYP1B1* gene variations on estrogen metabolism and their potential role in the development and progression of uterine leiomyomas.

Objective

- To identify and analyze genetic variations in the *CYP1B1* gene associated with uterine fibroids.
- To elucidate the molecular mechanisms by which these mutations contribute to fibroid development

Methodology

To investigate the mechanistic effects of *CYP1B1* mutations, we began by identifying genetic variants in the

CYP1B1 gene from uterine fibroid patients using whole exome sequencing. To predict the pathogenicity of these variants, we employed multiple computational tools, including PolyPhen-2, MutPred, SIFT, ProtVar, PMut, PANTHER, PhD-SNP, Meta-SNP, and SNAP. Structural stability of the selected mutations was assessed using tools such as DynaMut, mCSM, SDM, DUET, CUPSAT, MuPro, MaestroWeb, ProtVar, and Mutant 2.0. To evaluate the effect of missense mutations on estradiol (E2) binding, we performed ensemble docking, followed by 250ns molecular dynamics simulations to analyze atomic-level interactions and conformational changes.

Result

High purity DNA extracted from uterine fibroid tissue samples, collected with informed consent from the OBG department of JMMC&RI, underwent whole exome sequencing (WES) to identify gene variants associated with uterine fibroids. Analysis of the *CYP1B1* gene revealed multiple types of variations, including missense, silent, 3'UTR, 5'UTR, and non-coding exonic variants. Notably, all samples exhibited both silent and missense mutations. Focusing on the functional relevance we concentrated our studies on nine missense mutations.

In silico prediction tools consistently classified two of these—Pro193Leu (P193L) and Arg368His (R368H)—as highly pathogenic and structurally destabilizing. Binding energy analysis through ensemble docking indicated minimal differences in estradiol (E2) binding affinities across the nine variants. However, molecular dynamics simulations conducted over 250 ns revealed notable conformational changes in the binding poses of the P193L and R368H variants. Despite these pose shifts, the RMSD values for both the protein-ligand complex remained stable, suggesting altered binding dynamics without overall structural instability.

Conclusion

This study demonstrates that pathogenic *CYP1B1* missense mutations, specifically Pro193Leu and Arg368His, alter estradiol binding dynamics and may contribute to impaired estrogen metabolism, potentially playing a role in uterine fibroid pathogenesis.

Keywords: Uterine fibroids, Estrogen metabolism, *CYP1B1*, Missense mutation

BIOPHYSICAL MECHANISMS BEHIND BENZAMIDINE'S INHIBITION OF LYSOZYME MISFOLDING

Dileep K.V.

Laboratory for Computational and Structural Biology, JCMR

Background

Lysozyme amyloidosis, a rare hereditary form of systemic amyloidosis, results from lysozyme misfolding and fibril deposition, leading to multi-organ dysfunction. Current treatments are mainly symptomatic, highlighting the need for targeted anti-amyloid therapies. This study investigates the repurposing potential of benzamidine (BEN), a known serine protease inhibitor, and demonstrates its ability to inhibit lysozyme aggregation through biophysical and computational analyses.

Objective

To evaluate the inhibitory effect of BEN on human lysozyme fibrillation (HLF) and its binding, structural, and cytotoxic properties.

Methodology

Human lysozyme fibrillation was induced under acidic and thermal conditions, and the inhibitory effects of benzamidine (BEN) were assessed using a range of biophysical techniques (Thioflavin T (ThT), Congo red, and 8-Anilinonaphthalene-1-sulfonic acid (ANS) fluorescence assays). Binding interactions, structural changes, and aggregation kinetics were evaluated through fluorescence assays, ITC, CD spectroscopy, and microscopy (both scanning electron microscopy (SEM), and transmission electron microscopy (TEM)). Molecular docking and MD simulations provided mechanistic insights, while cytotoxicity was assessed in HEK-293 cells using the MTT assay.

Result

This study establishes that benzamidine (BEN) potently inhibits human lysozyme fibrillation (HLF) through a combination of biophysical and structural mechanisms. Thioflavin T and Congo red assays reveal a concentration-dependent suppression of β-sheet formation by BEN, with an IC_{50} of 134.91 ± 8.06 μM. ANS fluorescence indicates that BEN mitigates the exposure of hydrophobic regions critical for initiating aggregation. Fibrillation kinetics demonstrate that BEN significantly extends the lag phase—from 30.66 to 47.26 hours at 400 μM—and reduces fibril elongation rates. Binding studies using intrinsic tryptophan fluorescence and isothermal titration calorimetry confirm strong affinity near the lysozyme active site ($K_d = 2.39$ μM). Computational analyses, including molecular docking and 250 ns molecular dynamics simulations, show that BEN migrates toward aggregation-prone regions and forms stabilizing interactions, particularly with residues D53 and N60. Circular dichroism spectroscopy reveals that BEN enhances α-helical content (from 9.73% to 24.57%) while decreasing β-sheet content (from 23.71% to 17.63%), indicating partial restoration of native secondary structure. Morphological assessments via SEM and TEM confirm a marked reduction in fibril density and length. Furthermore, MTT assays in HEK-293 cells demonstrate that BEN is non-cytotoxic even at higher concentrations. Together, these results position BEN as a promising therapeutic candidate for lysozyme amyloidosis by stabilizing the native protein structure and effectively inhibiting pathological aggregation.

Conclusion

BEN effectively inhibits human lysozyme fibrillation through a distinct binding mechanism and exhibits no cytotoxicity, underscoring its potential as a therapeutic candidate for lysozyme amyloidosis.

Keywords: Lysozyme Amyloidosis, Protein Aggregation Inhibition, Benzamidine

PLASMA PROTEOME PROFILING AS BIOMARKER IN CLINICAL MEDICINE – THE CANDIDATE PROTEINS IDENTIFIED IN IDIOPATHIC ARTHRITIS (JUVENILE) AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Mathew John, Sonu Das, Vanditha Mohan

Biochemistry and Phytochemistry Research Division, JCMR

Background

Mass spectrometry (MS) based proteomics has become a powerful technology in clinical science research. Plasma proteomics is an upcoming diagnostic approach in pursuit of biomarker discovery for systemic inflammatory disease viz. Cardio and cerebrovascular diseases and autoimmune diseases.

Aim

To identify the differentially expressed proteins (DEPs) in chronic obstructive pulmonary disease (COPD) and Juvenile idiopathic arthritis (JIA) as disease biomarkers

Methodology

The blood was collected from COPD and JIA patients after obtaining informed consent and approval from institutional ethics committee. The plasma samples were subjected to immuno depletion, ultra filtration and protein quantification followed by tryptic digestion. The differentially expressed proteins were identified by LC MS-MS approach involving High performance liquid chromatography followed by electron spray ionization. Principal component analysis (PCA) and Receiver operator curve (ROC) of the DEPs of interest was done using MetaboAnalyst 6.0; a comprehensive platform for proteomics data analysis via a web based interface.

Result

Reticulocalbin-1 was found to be consistently upregulated in COPD samples compared to healthy controls. This protein had not been previously explored in the context of COPD. ROC curve analysis showed an AUC score of 0.908 for

reticulocalbin-1, indicating strong predictive potential. Similarly Myosin light chain 12B (Myl12Bprotein) showed consistent up regulation in JIA patients compared to healthy controls. ROC curve analysis showed an AUC score of 0.757 for Myl12B, indicating strong predictive potential.

Conclusion

The plasma proteomic approach could help in clinical medicine for diagnosis of systemic diseases like COPD and JIA, understanding the pathophysiology to strategize therapeutic intervention.

Keywords: Plasma proteomics, Biomarkers, Juvenile idiopathic arthritis (JIA), Chronic obstructive pulmonary disease (COPD), Mass spectrometry, Differentially expressed proteins (DEPs)

Author Index