Indian Journal of Pharmacy Practice., 2026; 19(2):297-303.
https://www.ijopp.org

Original Article

A Prospective Observational Study on Impact of Clinical Pharmacy Services in the Management of Medications and Pharmaceutical Care in Geriatric Patients in a Tertiary Care Hospital

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ABSTRACT

Aim: This research aims to evaluate how clinical pharmacy interventions affect patient outcomes, focusing on areas like patient counseling and pain management. **Materials and Methods:** This six-month prospective observational study was conducted at a tertiary care hospital, involving patients aged 60 and above. Customized questionnaires were used for patient counseling and pain management evaluation. Pain levels were assessed before and after discharge, and counseling was provided directly or through patient representatives when necessary. **Results:** Out of 132 patients, 63.64% received direct patient counseling, while 36.36% had their representatives counseled. Counseling sessions focused on educating patients about their medications, including their names, purposes, potential side effects, lifestyle modifications, and precautions. Improvement in physical activity, mobility, diet, mental health, and ensuring safety was seen post-counseling. Pain complaints were reported by 100 patients, in which the highest prevalence of pain was in females. 86% of patients depend on non-pharmacologic treatment. 66% of patients took analgesics, and most used was Tramadol. The mean pain score in NRS dropped significantly from 4.01 before management to 1.29 afterward with a higher pain satisfaction level. **Conclusion:** The study highlighted that clinical pharmacist involvement in geriatric care led to better medication management, fewer drug-related problems, and improved patient outcomes. Broader implementation of these services could further enhance care quality and reduce adverse events among elderly patients.

Keywords: Clinical Pharmacy Services, Geriatric Population, Patient Counseling, Pain Management.

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Received: 04-08-2025;
Revised: 29-09-2025;
Accepted: 17-11-2025.

INTRODUCTION

Clinical pharmacy services involve pharmacists in determining and monitoring a patient's pharmacotherapy. This has emerged globally in response to increasing drug-related morbidity and mortality. It contributes to improved medication adherence, reduced treatment costs, combating antibiotic resistance, enhanced facility reputation, and increased public trust in the healthcare system (Kilonzi *et al*., 2024). Hospital admissions in older adults are frequently drug-related and avoidable. Clinical pharmacy interventions during hospital stays might reduce drug-related harm and reduce hospital visits (Van der Linden *et al*., 2020). The elderly population frequently presents with complex health requirements due to multimorbidity, polypharmacy, and inappropriate prescriptions. Clinical pharmacists are crucial in optimizing pharmacotherapy within a multidisciplinary geriatric care team (Pachpute *et al*., 2023).

Patient Counseling

Patient counseling is the practice of assisting patients in taking their prescriptions as prescribed by providing them with information, direction, and support. As per USP, medication counseling is a strategy that concentrates on enhancing the patient's capacity to solve problems and preserve their well-being (Jauhari *et al*., 2022). Elderly patients may face several functional limitations. Due to declining vision and hearing, they often struggle with tasks such as removing child-resistant caps, self-administering insulin, or applying topical treatments like creams and ointments. They may also experience challenges related to literacy. Additionally, cognitive impairment becomes more common with age. Chronic conditions tend to increase in prevalence, and so does the number of prescribed medications as individuals grow older (Raja *et al*.,

DOI: 10.5530/ijopp.20260586

2020). At this point, patient counseling plays a crucial role in addressing these challenges.

Pain management

Pain is characterized as an unpleasant sensory and emotional experience related to actual or potential tissue damage or expressed in terms of such damage (Borsheski *et al.*, 2014). It can arise from various sources, including chronic conditions, disease symptoms, interventions, post-surgical effects, and injuries. Effective and safe treatment for elderly patients requires an understanding of age-related physiological changes, challenges in pain assessment, the specific impacts of common medications on older adults, and the importance of complementary therapies (Herr *et al.*, 2007). Managing chronic and acute pain in the elderly involves unique challenges, as this condition is both prevalent and often inadequately treated. Inadequate pain management is linked to several negative effects, including depression, anxiety, disrupted sleep, and mood disorders. As individuals aged over 75 represent the fastest growing demographic in developed countries, proper assessment and treatment of pain become increasingly important. This age group is more active and seeks to maintain independence and a high quality of life, making effective pain control essential to support these goals.[9]

MATERIALS AND METHODS

The study was based on a tertiary care hospital-based prospective observational study. The study was carried out for a time of 6 months. The study was conducted in the various departments of Indiana Hospital and Heart Institute, Pumpwell, Mangalore, Karnataka. The study includes inpatients, patients of both sexes, patients aged 60 years and above, and patients with comorbidities and excludes outpatients, patients below 60 years of age, patients with cancer, and patients who aren't willing to take part in the study. The sources of data are the questionnaires, patient case sheets, prescriptions and data collection forms.

Sample size

The sample size was determined using the Krejcie and Morgan (1970) table for finite populations. Based on the estimated patient population during the study period, the table suggested a minimum sample size of 126. To account for a 5% non-response rate, the final sample size was fixed at 132 participants. Participants were selected using convenience sampling, including all eligible patients available during the study period.

Study procedure

A prospective observational study was conducted in the various departments of Indiana Hospital and Heart Institute, Pumpwell, Mangalore. Considering the inclusion and exclusion criteria, the patients were enrolled after taking written consent from each patient for the study. A suitably designed data collection form was used to collect all the necessary information. Patient counselling was provided for the patient, and pain intensity was assessed during the first visit regarding the medication and lifestyle modification using the patient information leaflet. Post-discharge patient counseling forms and pain management forms are typically utilized 10 days after the patient has been discharged by using their contact information. The forms help healthcare providers evaluate the patient's recovery, address any ongoing concerns, and ensure that pain management strategies are effective. All patient information that was collected during the study will be kept confidential.

Statistical analysis

The collected data were systematically tabulated and analyzed using Microsoft Excel. Descriptive statistics were used to summarize the data. For inferential analysis, a two-tailed t-test was applied to compare pain scores between groups, while the chi-square test was used to assess differences in patient counselling outcomes. A p-value of <0.05 was considered statistically significant.

RESULTS

Patient counseling was given to 84 of the 132 individuals, while their representatives received patient counseling for the remaining 48 subjects.

Age-gender percentage distribution of participants

In this study involving 132 geriatric patients, the majority belonged to the 60-69 age group, comprising 43 males (32.58%) and 29 females (21.97%). In the 70-79 age group, there were 27 males (20.45%) and 22 females (16.67%). Among those aged 80 and above, 6 were males (4.55%) and 5 were females (3.79%). Overall, males outnumbered females across all age categories.

Percentage distribution of disease

The most prevalent comorbidities were Type 2 Diabetes Mellitus (34.09%), Hypertension (32.5%), and CAD (27.2%). Other frequently observed conditions included stroke (14.39%), chronic kidney disease (12.12%), and anemia (7.58%). Less common comorbidities such as chronic liver disease, infections, and various neurological, gastrointestinal, and respiratory conditions were also noted in smaller percentages (Figure 1).

Percentage distribution of parameters before and after patient counselling

An increase in *excellent* mental health (13.64% to 24.24%) and a reduction in *poor* mental health (11.36% to 0.76%) was seen post-counseling, with no change in the *good* category (75%). Before counseling, 40.91% of participants engaged in *frequent* physical activity, 40.15% had *infrequent* activity, and 18.94% participated occasionally. After counseling, the proportion of individuals with *frequent* physical activity increased to 49.24%, while *infrequent* activity decreased to 25.76%, and *occasional* activity rose slightly to 25%. Initially, 9.09% of participants had an

excellent diet, 82.58% had an *adequate* diet, and 8.33% reported a very *poor* diet. After counseling, *excellent* dietary intake rose to 19.70%.*Adequate* intake remained consistent at 80.30%, and very *poor* diet dropped to 0%, indicating an overall positive shift in dietary patterns. Before counseling, 59.85% of participants demonstrated an understanding of their disease and medications, while 40.15% lacked such understanding. Following counseling, 97% of subjects reported adequate understanding, reflecting a significant improvement in awareness and knowledge post intervention (Table 1).

Percentage distribution of participant's knowledge of medications post-counselling

98.48% of participants understood the name and purpose of their medicines, while 95.45% were informed about signs and symptoms related to their condition. Additionally, 83.33% gained awareness of potential side effects, and 87.88% were educated on necessary precautions. Furthermore, 96.97% acknowledged the importance of lifestyle modifications, indicating that the counseling sessions were effective in enhancing medication-related knowledge and self-care practices.

Gender-wise percentage distribution of participants having pain

Out of the total 132 participants enrolled in the study, 100 subjects reported experiencing pain during the assessment period. Among these 100 individuals, 57 were male and 43 were female.

Frequency distribution of subjects based on the provision of pharmacological and non-pharmacological treatment

Among the 100 study participants, 66 received pharmacological treatment, while 34 did not. Within the pharmacological group, 49 participants were prescribed a single analgesic, 12 received two analgesics, and 45 were administered three analgesics. Regarding non-pharmacological care, 13 participants underwent physiotherapy, 52 were advised to take complete rest, 21 were encouraged to engage in mild physical activity and exercises, and 14 did not receive any non-pharmacological intervention.

Frequency and percentage distribution of drugs provided in pain management

Among the oral analgesics used, tablet paracetamol (Tab. Dolo) was administered to 17 subjects, tramadol hydrochloride-acetaminophen (Tab. Ultracet) combination to 8 subjects, tramadol to 7 subjects, aspirin and ibuprofen to 4 subjects each, etodolac to 2 subjects, and flupirtine maleate-paracetamol (Tab. Ketoflam P) combination to 1 subject. Regarding injectable formulations, injection tramadol (Inj. Supridol) was given to 20 subjects, injection paracetamol (Inj. Neomol) to 11 subjects, and injection diclofenac (Inj. Dynapar AQ) to 5 subjects. Additionally, 1 subject received a diclofenac-paracetamol (Tab. Dynapar) combination tablet, and 1 subject was administered a paracetamol suppository (Neomol Neomol Suppository). Adjuvants like pregabalin-mecobalamin (Tab. Pregaba M), amitriptyline (Tab. Tryptomer), mecobalamin-ALA-vitamin (Tab. Nervigen), and pregabalin-nortriptyline (Tab. Neuroset) were used in 8 subjects (Figure 2).

Distribution based on the number of analgesics taken by a subject

The number of analgesic drugs prescribed per individual varied across the study population. Many subjects, 49%, received monotherapy with a single analgesic. Two analgesics were prescribed to 12% of the participants, while 5% received a combination of three drugs. This distribution suggests that most patients were effectively managed with single-drug therapy for pain relief, with a smaller proportion requiring combination therapy.

Table 1: Frequency distribution of parameters before and after patient counselling.

Parameter	Category	Before counseling (%)	After Counseling (%)	*p*-Value
Mental Health	Excellent	13.64	24.24	<0.001
	Good	75	75	
	Poor	11.36	0.76	
Physical Activity	Frequent	40.91	49.24	<0.001
	Infrequent	40.15	25.76	
	Occasional	18.94	25	
Dietary Patterns	Excellent	9.09	19.7	<0.001
	Adequate	82.58	80.3	
	Very Poor	8.33	0	
Understanding of Disease and drugs	Adequate	59.85	97	<0.001
	Inadequate	40.15	3	

Comparison of pain scores of the participants before and after the pain management

Before the intervention, pain scores among the 100 subjects were varied. A total of 32 subjects reported a pain score of 0, followed by 2 subjects with a score of 1, 20 with a score of 2, 23 with a score of 3, and 19 with a score of 4. Additionally, 16 subjects reported a score of 5, 10 reported a score of 6, 3 reported a score of 7, 5 reported a score of 8, and 1 subject had a score of 9. None of the subjects reported the maximum score of 10. Following pain management, the number of subjects with a pain score of 0 increased to 50, while 45 reported a score of 1, 29 reported a score of 2, 6 reported a score of 3, and 2 reported a score of 4. No subjects experienced pain scores above 4 after the intervention (Figure 3).

DISCUSSION

Geriatric counseling plays a key role in improving the overall well-being of elderly patients. It positively impacts both their mental and physical health, leading to a better quality of life. Many older adults struggle with taking medications correctly and understanding their purpose. Counseling helps address these challenges by increasing awareness, encouraging proper medication use, and helping them take charge of their health (International Journal of Geriatric Nursing, 2025).

Most of the participants in our study were between the ages of 60 and 69 (54.55%), followed by those between the ages of 70 and 79 (37.12%) and 80 and over (8.33%). This is in line with the results of Shinu C. *et al.*, (2020), which showed that 50.4% of the subjects were between the ages of 60 and 70. Furthermore, of the patients, 29.6% were between the ages of 70 and 80, 3.9% were between the ages of 90 and 100, and the remaining 14.5% were between the ages of 80 and 90. As well as 56 (42.42%) were female and 76 (57.58%) were male. This is consistent with Shinu *et al.*, (2020) findings, which show that higher 326 (42.3%) of the patients were female, whereas 444 (57.7%) of the patients were male. In our study, diabetes and hypertension were the most prevalent comorbidities among elderly patients, followed by coronary artery disease, stroke, and chronic kidney disease. Less common conditions included anemia, infections, liver disease, and neurological disorders such as Parkinson's disease and seizures. These findings emphasize the burden of multiple chronic illnesses in geriatric populations and the need for holistic care. Similar trends were observed in the study by Shinu *et al.*, (2020). Our study showed a significant improvement in dietary habits among elderly patients after counseling ($p<0.001$). Initially, only 9.09% had an excellent diet, while 8.33% had a very poor diet. After counseling, 19.70% followed an excellent diet, and no one had a very poor diet. These findings align with Pedersen *et al.*, (2022), highlighting the value of personalized nutrition advice, especially for elderly patients with appetite or intake issues. Our study showed that counseling significantly improved both physical activity and mental well-being among elderly participants. After counseling, frequent physical activity increased from 54 to 65 participants, while infrequent and occasional activity decreased ($p=0.000$). Mental health also improved, with excellent mental health rising from 13.64% to 24.24%, and poor mental health dropping from 11.36% to 0.76% ($p<0.001$). These results align with Shinu *et*

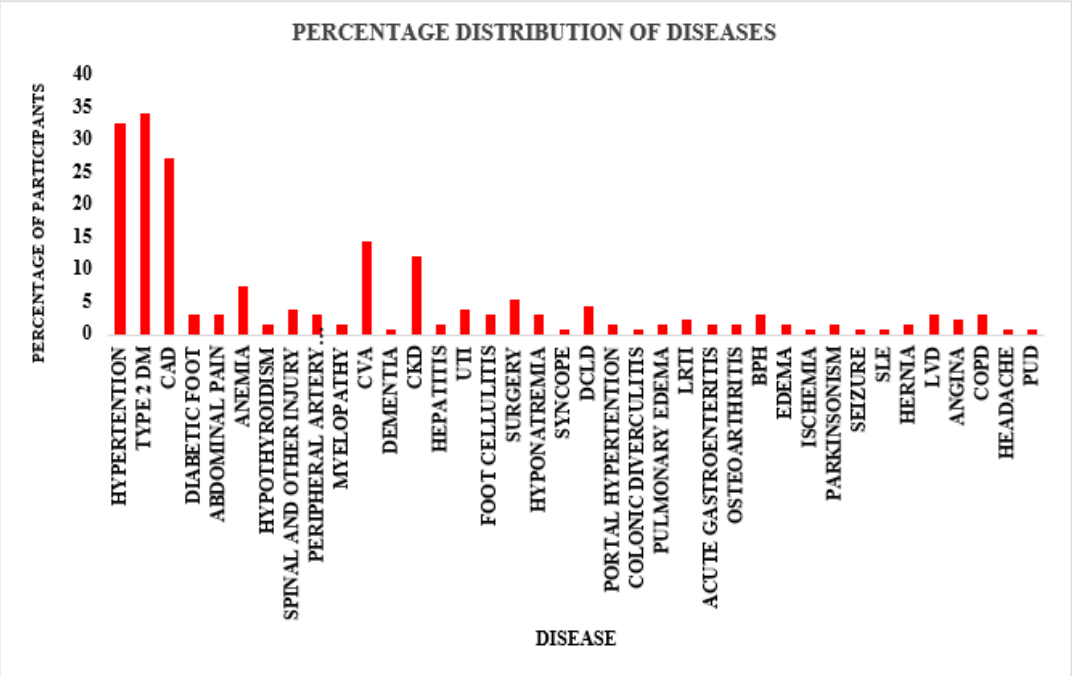

Figure 1: Percentage distribution of disease in participants.

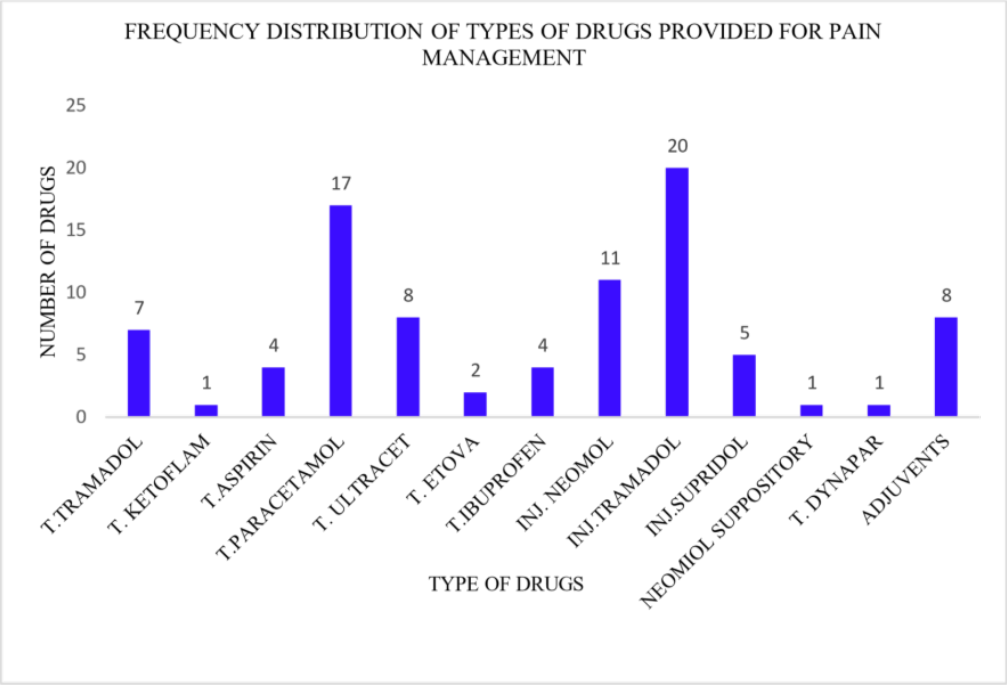

Figure 2: Frequency distribution of pharmacological treatment provided to the participants with pain management.

al., (2020), who also reported improvements in quality-of-life domains following intervention. In our study, general health, physical functioning, and limitations due to physical health showed notable gains post-counseling, along with enhanced social functioning, emotional well-being, and energy levels (all $p<0.001$), highlighting the broad benefits of structured counseling. In our study, patients were consistently provided with clear and comprehensive information about their medications, including their purpose, possible side effects, necessary precautions, and recommended lifestyle changes. This highlights the importance of effective communication during counseling to promote safe and informed medication use. Similar findings were reported by Capiau *et al*., (2020), emphasizing the value of patient education in improving adherence and overall treatment outcomes. Out of 132 participants in our study, 100 individuals (75.76%) reported experiencing pain, while 32 did not. Among those reporting pain, 57% were male and 43% were female. This distribution differs from the findings of Zulfunaz Ozer *et al*., (2020), where a higher proportion of pain was reported by females (51.9%) compared to males (48.1%). The discrepancy may be due to the higher number of male participants in our study, which could have influenced the overall distribution. Nevertheless, when analysed proportionally, 77% of the total female participants reported pain, compared to 75% of male participants, indicating a relatively higher prevalence among females. These observations are further supported by the findings of Tina Mallon *et al*., (2018), which highlight similar gender-related patterns in pain prevalence. In our study, 66% of participants received medication for pain management, reflecting a strong reliance on pharmacological treatment. This is in line with findings by Susanna Rapo-Pylkkö *et al*., (2016), who also observed frequent use of medications for managing pain. non-pharmacological approaches included physiotherapy (13%), rest (52%), and mild physical activity or exercises (21%), either alone or alongside analgesics. These findings align with those of Martin Ringsten *et al*., (2023), who also reported rest as the most frequently recommended treatment, followed by exercise and physiotherapy. In our study of 66 patients, most (74.24%) were prescribed one analgesic, while 18.18% received two, and 7.5% were on three analgesics. Tramadol was the most used, followed by paracetamol, either alone or in combination. These findings are consistent with Krzysztof Rutkowski *et al*., (2023), who also reported tramadol and paracetamol as the most frequently used analgesics. The average pain score before treatment was 4.01 (SD=1.766), indicating moderate pain, which significantly dropped to 1.29 (SD=0.902) after management, demonstrating the effectiveness of the intervention.

Novelty and contribution in Indian healthcare sector

Although global studies support the benefits of clinical pharmacy services, evidence from India is scarce. Our study demonstrates that pharmacist-led counseling can significantly improve lifestyle, quality of life, and pain management in elderly patients. Unlike Western countries where such services are well established, in India they are still emerging, making our findings novel and highlighting their feasibility and effectiveness in tertiary care hospitals.

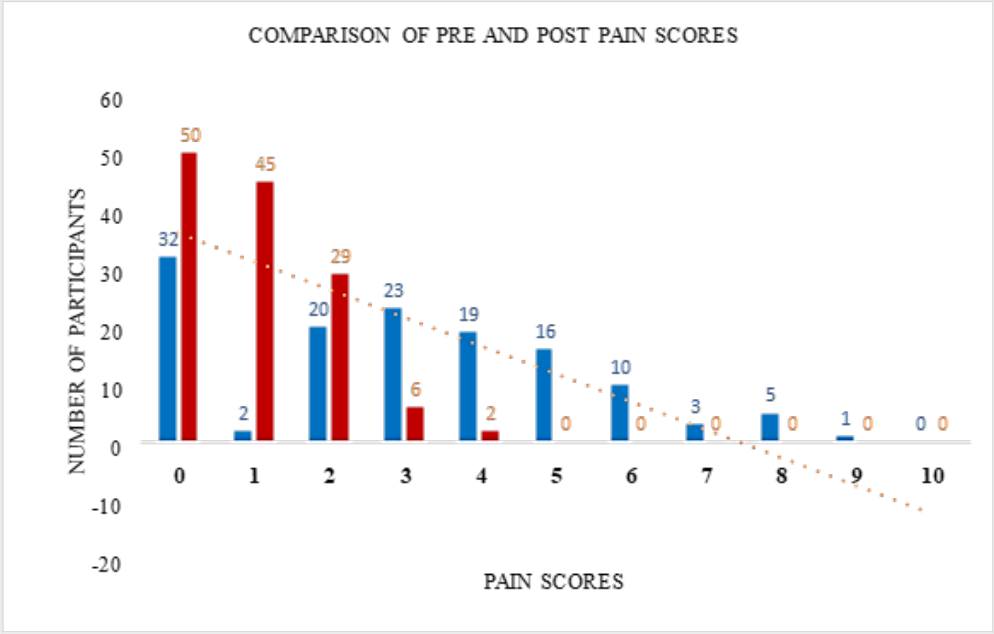

Figure 3: Comparison of pain scores of participants before and after pain management.

CONCLUSION

This study underscores the significant impact of geriatric counseling in enhancing the overall well-being of elderly patients by addressing key aspects of health such as diet, physical activity, mental well-being, and pain management. Counseling interventions led to statistically significant improvements in dietary habits and physical activity levels, as well as notable enhancements in mental health status. Most participants were managing chronic conditions such as type 2 diabetes mellitus, hypertension, and coronary artery disease, consistent with patterns observed in similar studies. Pain was highly prevalent, and Counseling supported the implementation of effective management strategies. Among analgesics prescribed, tramadol was the most used, followed by paracetamol, either alone or in combination. Pain intensity significantly decreased following intervention, indicating the effectiveness of both pharmacological and non-pharmacological approaches. These findings affirm the vital role of structured counseling in improving the quality of geriatric care and support the integration of clinical pharmacy services in multidisciplinary healthcare teams.

ACKNOWLEDGEMENT

We express our heartfelt gratitude to the Almighty for blessing us with good health, wisdom, and strength throughout the course of our project. We extend our sincere thanks to Dr. Jagadish V. Kamath, Principal of Shree Devi College of Pharmacy, Mangalore, and the Shree Devi Education Trust for their continuous support and encouragement. We are also deeply grateful to the Indiana Hospital and Heart Institute, Mangaluru, for providing the necessary resources and cooperation that made this study possible.

ABBREVIATIONS

CAD: Coronary Artery Disease; **CKD:** Chronic Kidney Disease; **COPD:** Chronic Obstructive Pulmonary Disease; **CVA:** Cerebrovascular Accident; **DCLD:** Decompensated Liver Disease; **DM:** Diabetes Mellitus; **INJ:** Injection; **LRTI:** Lower Respiratory Tract Infection; **LVD:** Left Ventricular Dysfunction; **NRS:** Numerical Rating Scale; **PUD:** Peptic Ulcer Disease; **SD:** Standard Deviation; **SLE:** Systemic Lupus Erythematous; **TAB:** Tablet; **UTI:** Urinary Tract Infection.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR'S CONTRIBUTION

Dr. Cyril Tom provided the project idea, topic guidance, and supervision. Devika and Renee handled data collection, thesis writing, and manuscript preparation. Sanjana and Wilsita assisted with data collection and manuscript drafting. All authors approved the final manuscript.

SUMMARY

A 6-month prospective observational study was conducted in the various departments of Indiana Hospital and Heart Institute, Mangalore, involving 132 geriatric inpatients aged ≥60 years with comorbidities. Data were collected using case records, prescriptions, structured forms, and questionnaires, with patient counseling provided during admission and follow-up conducted post-discharge. The most common comorbidities identified were Type 2 Diabetes Mellitus (34.09%), Hypertension (32.5%), and Coronary Artery Disease (27.2%). Counseling

interventions significantly improved patient outcomes, including mental health, physical activity, dietary practices, and disease awareness, with overall understanding of illness and medications increasing from 59.85% to 97%. Almost all participants demonstrated enhanced knowledge of medicines, side effects, precautions, and the importance of lifestyle modifications. Of the total participants, 100 reported pain, of whom 66 received pharmacological management (primarily paracetamol, tramadol, and adjuvants) and the remainder were managed through non-pharmacological measures such as rest, physiotherapy, and mild exercises. Nearly half of the patients (49%) were effectively managed with single-drug therapy. Pain scores demonstrated a significant reduction post-intervention, with no patients reporting severe pain and 50 achieving a pain score of zero. These findings highlight the pivotal role of clinical pharmacy services in improving medication knowledge, lifestyle practices, and effective pain management in the geriatric population.

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Cite this article: Radhakrishnan D, Rego RL, Sanjana, D'Souza WS, Tom C. A Prospective Observational Study on Impact of Clinical Pharmacy Services in the Management of Medications and Pharmaceutical Care in Geriatric Patients in a Tertiary Care Hospital. Indian J Pharmacy Practice. 2026;19(2):297-303.