

Original Research Article

The impact of a comprehensive clinical pharmacist counseling intervention program on patients with chronic illness in India: a quasi-experimental study

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ABSTRACT

Background: Chronic conditions such as cardiovascular disorders, diabetes mellitus, respiratory disorders, and cancer continue to be predominant cause to morbidity and mortality globally. Suboptimal adherence to prescribed medication represents a critical obstacle to achieve optimal therapeutic outcomes and effective disease management. Objective of the study was to assess the effect of a comprehensive clinical pharmacist counseling intervention program (CPCIP) on medication adherence, knowledge, attitudes, practices (KAP), and patient satisfaction among individuals with chronic illnesses in a tertiary care hospital in India.

Methods: The quasi-experimental study was conducted with pre and post interventions among patients with chronic diseases at a tertiary care hospital. Clinical pharmacists delivered systematic counseling regarding medication adherence, lifestyle modifications, and disease management strategies. Along with that, the Morisky medication adherence scale (MMAS-8), a validated KAP scale, and satisfaction questionnaires were used before and after the intervention.

Results: This study evaluated the CPCIP intervention improved adherence and KAP scores with patient satisfaction, the mean MMAS-8 score significantly increased post intervention from 3.05 ± 1.10 to 5.55 ± 0.95 ($p < 0.001$). The three domains KAP also demonstrated an improvement while patients reported satisfaction level 8.62 ± 0.84 out of 10 scale. There were positive correlations were found among satisfaction, adherence scores, and KAP improvements.

Conclusions: The CPCIP effectively enhanced adherence, patient understanding, and satisfaction. Integrating pharmacist-led counseling within routine healthcare services can supports effective chronic disease management, reduce complications, and healthcare burden while improving overall healthcare outcomes in patients with chronic illness in India.

Keywords: Chronic disease, Clinical pharmacist, Counseling intervention, Pharmacist-led program, Patient education, Medication adherence, KAP

INTRODUCTION

Non-communicable diseases (NCDs) including cardiovascular disorders, diabetes, cancers, and chronic respiratory conditions now account for most deaths and long-term disability across the world. According to World Health Organization (WHO) data, roughly seven in ten

global deaths result from NCDs, and the burden is much higher in low to middle income country such as India as well, where the burden has been continuously rising.¹ The increasing prevalence of these conditions causes immense burden on healthcare system, communities, and families, leading effective chronic disease management a public health priority.

Chronic illness management is challenging among which one of the main obstacles to effective treatment of chronic illness is inconsistent use of prescribed medicines.² Globally, only about half of patients with chronic conditions adhere to prescribed medications, with is even lower in developing nations.³ When patients do not follow their medication plans, disease control weakens, hospital visits rise, and healthcare expenses grow.⁴ In India, adherence is further affected by socioeconomic factor, low health literacy, polypharmacy, and limited availability to structured patient counseling services.¹

Pharmacists are often the most accessible professionals within the health system. Their responsibilities now reach well beyond dispensing they promote the safe and rational use of medicines and guide patients on correct administration and side-effect management, counselling patients on self-care, monitoring therapy, lifestyle modification guidance, and enhancing understanding between patients and prescribers.⁵ Evidence from international research studies shows that pharmacist-delivered counselling and monitoring can raise adherence levels, improve treatment results, and enhance how patients experience their care.⁶⁻⁹ Evidence shows that these interventions not only improve medications adherence and satisfaction but, also contribute to reduced hospital re-admissions, better disease management, and lower healthcare costs.^{10,11}

Several international studies support the effectiveness of pharmacist-lead programs reported that pharmacist-led interventions improved both adherence and clinical outcomes in patients with hypertension and hyperlipidemia.⁶ Similarly, studies have shown that pharmacist-led medication management improves chronic disease outcomes and better patient understanding and satisfaction, emphasizing the value of clear communication and ongoing support in care.^{7,12} Findings of some studies are comparable in chronic disease management clinics, where patients expressed high satisfaction with pharmacist intervention in care.^{9,13} Although, there is strong global evidence from the studies but In India, the inclusion of clinical pharmacists within direct patient-care team is still at an early stage of development. Pharmacists in many Indian hospitals remain largely to dispensing functions, with limited participation in direct patient care.¹⁴ Factors such as lack of awareness among patients as well as healthcare professionals, insufficient training, and infrastructural limitation act as a barrier for the implementation of clinical pharmacy services.¹⁴⁻¹⁶ However, recent studies conducted within the Indian healthcare context indicate that structured pharmacist counseling can significantly improve patients' knowledge, adherence, and self-management behaviors.¹⁷

To bridge this gaps, this study introduced as a structured intervention the comprehensive clinical pharmacist counselling intervention program (CPCIP) designed to evaluate how systematic pharmacist support influences

adherence and patient experience as a structured, patient-centered intervention focused on continuity of care and systematic follow-up, provides individualized counseling sessions tailored to the patient's literacy level, language, and cultural background, supported by educational materials.

In this study our aim is to evaluate the impact of CPCIP on medication adherence and behavioral outcomes among patients with chronic diseases at tertiary care hospital in India. Secondary objectives include assessing changes in knowledge, attitudes, practices (KAP), and patient satisfaction level. By evaluating this intervention, the study seeks to produce evidence supporting the integration of clinical pharmacists into multidisciplinary healthcare team as a cost-effective solution, thereby contributing to improved chronic disease management and better health outcomes in India.

METHODS

Study design and setting

Study design was quasi-experimental with pre- and post-intervention comparison. The work took place at Geetanjali Medical College and Hospital in Udaipur, Rajasthan, after receiving institutional ethics approval (Approval No: GU/HREC/EC/2024/2624), and written informed consent was obtained from all participants. The study was conducted over a period of seven months, from September 2024 to March 2025.

Participants

Adults aged 18 years and above with at least one chronic illness (including cardiovascular disease, diabetes mellitus, COPD, asthma, and cancer), patients who were on multiple medications (polypharmacy) and who were on prescribed long-term medications therapy were included. Individuals who were unable to understand counselling session due to cognitive limitations, along with pregnant or breastfeeding women, minors, and anyone declining consent, were excluded from the study.

Intervention

The CPCIP was implemented as a structured, patient-centered intervention that emphasized ongoing follow-up and coordination of care. Each participant received one-to-one counselling on medicine use, disease awareness, device handling, and lifestyle practices aimed at improving adherence, recognition of adverse effects, and self-management as per the patient's literacy level, language, and cultural background, supported by educational materials in both English and Hindi.

Study tools

Adherence levels were measured with the eight-item Morisky medication adherence scale (MMAS-8). Change

in levels of KAP were assessed with the help of validated questionnaire. Satisfaction level with pharmacist-led intervention was assessed after counseling by using structured feedback form.

Data collection and analysis

Baseline information were collected during enrollment, and compared with post-intervention data collected after counseling sessions. Descriptive statistics and paired-sample tests were applied to compare pre- and post-intervention differences. A significance of $p < 0.001$ was used for statistical tests.

RESULTS

Baseline characteristics

The study enrolled 180 participants in the CPCIP intervention 123 men (68.3%) and 57 women (31.6%). Participant ages ranged from 23 to 79 years, with a mean of 59.4 ± 12.2 . Approximately 24.4% were younger than 45 years, 37.8% were between 45 and 64 years, and 37.8% were 65 years or older. The Charlson comorbidity index (CCI) was 3.2 ± 2.1 (range 0–9), indicating a chronic illness among participants.

Initial assessments showed low adherence and limited awareness regarding both prescribed treatments and the nature of their chronic illnesses, reflected in low mean pre-counseling MMAS-8 and KAP scores. These findings support the need for structured pharmacist led counselling to address low medication adherence, worsen symptoms, poor quality of life, increased healthcare cost, burden on caregivers and healthcare system.

Table 1: Patient details.

Descriptors	N (%)
Female	57 (31.6)
Male	123 (68.3)
Age in years, mean (SD; range)	59.4 (12.2; 23–79)
<45	44 (24.4)
45–64	68 (37.8)
≥65	68 (37.8)
Charlson comorbidity index, mean (SD; range)	3.2 (2.1; 0–9)

Medication adherence outcomes (MMAS-8)

Medication adherence was measured using MMAS-8, shows significant improvement after counselling intervention (Table 2). Mean score of MMAS-8 improved from 3.05 ± 1.10 (before-counseling) to 5.55 ± 0.95 (after-counseling), mean improvement of 2.50. The median MMAS-8 scores improved from 3.00 (pre-counseling) to 5.50 (post-counseling), and the range narrowed from

0.00–5.50 to 3.20–7.80, signifying more consistent adherence among participants.

Table 2: Descriptive statistics of MMAS-8 scores (pre- and post-counseling).

MMAS-8 scores	Pre-counseling	Post-counseling
Sample size (N)	180	180
Mean score	3.05 ± 1.10	5.55 ± 0.95
Minimum score	0.00	3.20
Maximum score	5.50	7.80
Median score	3.00	5.50

The observed improvement was statistically significant ($p < 0.001$, paired t-test). Figures 1 and 2 shows the upward shift in the distribution of MMAS-8 scores, with most participants transitioning from low to moderate and high adherence levels following the pharmacist counselling sessions. These findings confirm that the CPCIP effectively enhanced medication-taking behaviour, by counselling, education, motivation, and support of self-management strategies.

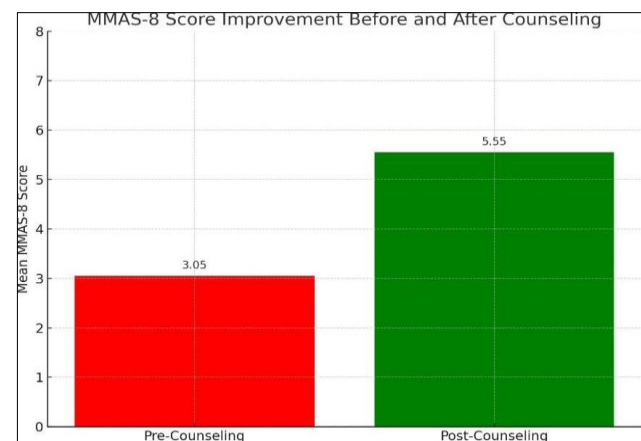


Figure 1: Bar graph of mean MMAS-8 improvement.



Figure 2: Distribution of MMAS-8 scores before and after counseling (histogram/density plot).

Knowledge, attitude, and practice outcomes

The descriptive statistics of KAP parameters are summarized in Table 3. Substantial improvements were noted in all three components KAP following counselling. The mean score of knowledge increased from 8.61 ± 3.16 to 14.00 ± 2.70 , an improvement of +5.39. This improvement reflects enhanced understanding of disease conditions, therapeutic regimens, and medication use. Followed by attitude mean scores increased from 21.99 ± 2.92 to 27.50 ± 3.10 , representing a mean improvement of +5.51, suggesting more positive perceptions toward treatment and a greater sense of responsibility for medication adherence. Followed by mean practice score improved from 22.07 ± 2.97 to 26.00 ± 3.20 , improvement of +3.93, showing that participants translated improved knowledge and attitude into better healthcare behaviours.

Table 3: Descriptive statistics of KAP scores (pre- and post-counseling).

KAP parameters	Pre-counseling (mean $\pm$ SD)	Post-counseling (mean $\pm$ SD)	Mean improvement
Knowledge	8.61 $\pm$ 3.16	14.00 $\pm$ 2.70	+5.39
Attitude	21.99 $\pm$ 2.92	27.50 $\pm$ 3.10	+5.51
Practice	22.07 $\pm$ 2.97	26.00 $\pm$ 3.20	+3.93
Overall KAP	52.68 $\pm$ 6.93	67.50 $\pm$ 7.00	+14.82

The overall KAP score increased from 52.68 ± 6.93 to 67.50 ± 7.00 , yielding a mean improvement of 14.82 ($p < 0.001$).

A paired t-test (Table 4) confirmed the statistical significance of these changes across all domains: knowledge: $t=24.45$, attitude: $t=24.56$, practice: $t=17.08$, and overall KAP: $t=28.57$ ($p < 0.001$). These findings establish the positive effect of counselling intervention on patients' understanding, motivation, and medication-taking behaviour.

Graphical representations (Figures 3 and 4) demonstrate visible improvement across domains, with post-counselling distributions showing higher median values and reduced variability, indicating a consistent and robust intervention effect across participants.

Patient satisfaction with counseling

Satisfaction level after counselling intervention among patients, were assessed through a 10-point feedback scale, shows uniformly positive responses. The mean satisfaction score was 8.62 ± 0.84 , with a median of 9.0. Approximately 89.4% of patients rated the counselling session with a score of 8 or higher, and 38.3% rated a perfect score of 10. The results show strong satisfaction among participants of CPCIP intervention.

Table 4: Paired t-test results.

KAP parameters	t-statistic	P value	Statistical significance
Knowledge	24.45	<0.001	Significant
Attitude	24.56	<0.001	Significant
Practice	17.08	<0.001	Significant
Overall KAP	28.57	<0.001	Significant

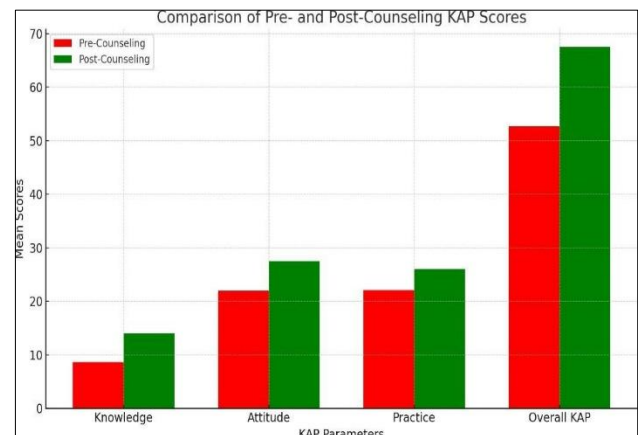


Figure 3: Bar graph of KAP score improvement (pre versus post).

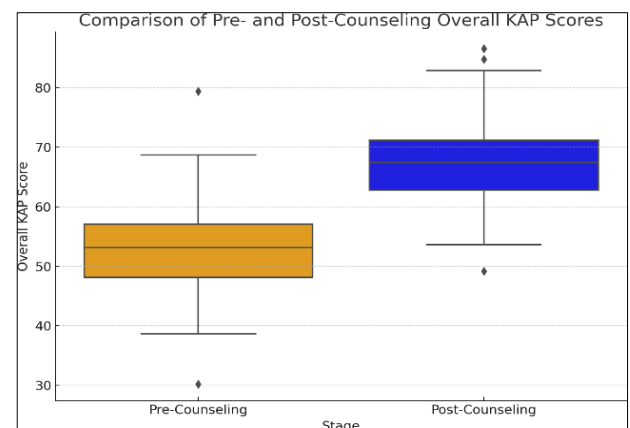


Figure 4: Box plot of overall KAP score post-counseling.

Participants highlighted clarity of information, personal interaction, and relevance of advice and guidance given by the pharmacist. The histogram of feedback scores shows a right-skewed distribution, confirming that satisfaction among the participants was high.

Correlation between patient feedback, KAP, and MMAS-8

To evaluate a relationship between feedback, KAP, and MMAS-8 outcomes a Pearson correlation analysis was done (Table 5). Analysis revealed moderate positive relationships between satisfaction scores and adherence ($r=0.42$), as well as between satisfaction and KAP

outcomes ($r=0.47$). These findings suggest that patients who reported higher satisfaction with counselling also demonstrated improved adherence and greater gains in knowledge and practice. The heatmap (Figure 5) illustrates the interrelated nature of satisfaction, adherence, and educational outcomes, supporting that well-delivered pharmacist counselling influences both behavioural and perceptual aspects of adherence.

Overall, the CPCIP was found to be feasible, effective, and well-accepted across diverse patient groups, leading to improved adherence, better knowledge and practices, and high satisfaction with pharmacist counseling.

Table 5: Pearson correlation matrix between feedback score, MMAS-8 post, and KAP post scores.

Variables	Feedback score	MMAS-8 (post)	KAP (post)
Feedback score	1.00	0.42	0.47
MMAS-8 (post)	0.42	1.00	0.51
KAP (post)	0.47	0.51	1.00

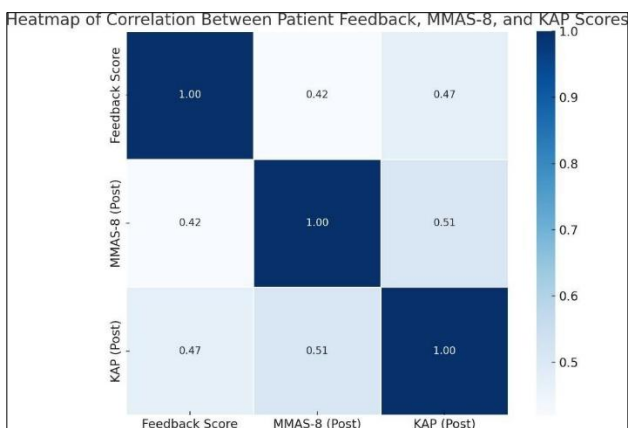


Figure 5: Heatmap of correlation between patient feedback, MMAS-8, and KAP scores.

DISCUSSION

This study shows that CPCIP significantly improved medication adherence, knowledge, attitudes, practices, and patient satisfaction level among individuals with chronic illnesses. Findings of intervention strengthen the evidence supporting pharmacist-led counselling as a crucial component for chronic disease management.^{6,8,9,12}

Non-adherence to medication continues to be a global challenge, only about half of patients with chronic conditions following prescribed therapies.² In this study the structured counseling session by clinical pharmacists led to a significant improvement in adherence level among patients measured by the MMAS-8 scale. The results of CPCIP intervention aligns with previous studies showing that pharmacist led programs improves adherence and treatment outcomes by improving patient understanding, reducing forgetfulness, and addressing misconceptions

about medication.^{4,6,7,18} Patients who participated in CPCIP reported better clarity about their medicines and shows more consistent medication-taking behavior, reflecting similar outcomes observed in other pharmacist-led chronic disease management studies.^{8,9,19}

CPCIP also shows significant improvements in level of patient knowledge, followed with improved KAP. Before counseling intervention many of participants show a limited understanding of their health conditions and importance of managing chronic illness. After pharmacist-led intervention, there was a noticeable shift toward more positive attitudes and self-care practices. This improvement highlights how patient-centered counseling encourage empowerment and self-efficacy, both are essential for long-term disease management.^{5,12,17} These findings are consistent with studies showing that pharmacists can help patients behavioral change from passive to active participants in their treatment.^{9,11}

Satisfaction level with counselling session among participants were observed as high, which further validates the role of pharmacists as approachable and trusted healthcare professional. Most of the participants rated their counseling experience positively, mentioned the clarity of explanations and personal attention received. Similar findings have been reported in other healthcare settings, where patients valued pharmacist involvement for their care and willingness to listen.^{12,13} When patients feel supported and understood, their adherence improves a correlation that supports the value of integrating pharmacists into patient care teams.^{7,8,18}

An additional implication of this study is its potential for cost-effectiveness. Non-adherence is closely associated with treatment failure, disease progression, and hospitalizations which burden healthcare systems.^{3,10} Pharmacist-led interventions, while resource efficient can reduce these indirect costs by preventing complications and improving disease control. Earlier evidence suggests that such programs are not only clinically effective but also economically sustainable in resource-limited settings.^{10,11} Thus, implementing programs like CPCIP results in both clinical and economical benefits in healthcare system.

Studies have documented that pharmacists contribute significantly to improving therapeutic outcomes, especially in settings dealing with chronic diseases.^{5,15,20} However, as seen in other developing healthcare systems, full integration of pharmacist as a patient care companion into healthcare system in India remains limited by a lack of institutional frameworks and awareness.¹⁴ Addressing these gaps could support the potential of pharmacists to deliver continuous, patient-centered care especially in managing complex chronic conditions.

While this study provides strong evidence of CPCIP's effectiveness, certain limitations must be acknowledged. Medication adherence level was assessed among limited numbers of participants due to limited time duration, self-

reported measures, which may introduce recall or reporting bias. The short follow-up duration limited the ability to evaluate the behavior changes over time. However, for chronic illness, it is generally understood that strict and long-term therapy, lifestyle alteration, and continual follow-up observation are needed to see any measurable clinical benefits. The longer follow-up should mean more accurate assessments of the effect of the intervention. Future research should consider multicenter trials with larger sample size, longer duration with multiple follow-up periods and include clinical outcome measures such as blood pressure, glycemic control, and hospitalization rates to further validate these results with overall impact of pharmacist-led counseling on long-term patient health and healthcare cost savings.

CONCLUSION

This study provides clear evidence that the structured CPCIP approach strengthened medication adherence, broadened patient understanding, encouraged healthier attitudes, self-care practices, and led to higher satisfaction with care provided by pharmacist to the patients with chronic illness. Participants show increased confidence in therapy, improved lifestyle habits, and high levels of satisfaction with pharmacist-led services.

These findings indicate the essential role of clinical pharmacist in patient care team. In a resource-limited healthcare system, where physicians hardly have time and patients suffer from either low literacy or economic challenges, counseling led by the pharmacist could be the most feasible, inexpensive, and patient-centered approach. The study also correlates long-term economic benefits as improved adherence leads to reduced avoidable complications, re-visits, hospitalizations, and treatment failures, thereby minimizing the overall healthcare burden on the patients and the system.

The evidence from this study suggested the need for integration of clinical pharmacists into multidisciplinary healthcare team for patient care in India. Implementation of such interventions at the primary level could change the way chronic health care is delivered in terms of healthcare outcomes, satisfaction, and economic benefits.

In conclusion, CPCIP provides as a patient-centered evidence-based model for increased adherence and self-efficacy among patients in the management of their chronic diseases. This study demonstrated the feasibility and benefits of pharmacist-led counseling strongly supports as a structured program for institutional and policy-level adoption to recognize the role of pharmacists in multidisciplinary healthcare teams.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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