

Research Paper



## Pharmacist-led counseling and its effect on patient outcomes in primary care

Adari E L Lakshmi Vani Sruthi\*<sup>ID</sup>

\*Department of Pharmaceutical Sciences, Vignan Institute of Pharmaceutical Technology (A), Duvvada, Visakhapatnam, Andhra Pradesh, India.

### Article Info

#### Article History:

Received: 06 March 2025  
Revised: 23 May 2025  
Accepted: 30 May 2025  
Published: 15 July 2025

#### Keywords:

Counseling Pharmacists  
Medications Compliance  
Primary Care  
Patient Outcomes  
Chronic Disease Management  
Clinical Pharmacy



### ABSTRACT

**Background:** Pharmacist-led counseling is a promising primary care intervention, yet evidence on its practical efficacy remains limited. This study appraises the effects of structured pharmacist-led counseling on medication adherence, clinical outcomes and patient satisfaction in primary care.

**Methods:** A six-month prospective randomized controlled trial was conducted in Mumbai, India. Patients with chronic conditions (hypertension, type 2 diabetes, dyslipidemia) were randomized into a pharmacist-led counseling group (n=120) or control group (n=120). The intervention included monthly medication review, adherence counseling, disease education, side-effect monitoring and lifestyle modification. Outcomes measured included MMAS-8 adherence scores, systolic blood pressure, HbA1c, hospital admissions, patient satisfaction and drug-related problems.

**Results:** At six months, the intervention group showed significant improvements. Medication adherence increased from 61.2% to 84.7% (p<0.001), systolic blood pressure decreased by 16.2 mmHg (p<0.001) and HbA1c reduced by 1.3% points (p<0.001). Hospital admissions dropped by 56.3% (p=0.002), patient satisfaction improved from 6.8 to 8.9/10 (p<0.001) and drug-related problems decreased by 60.9% (p<0.001).

**Conclusion:** Pharmacist-led counseling significantly improves medication adherence, chronic disease management and patient satisfaction while reducing hospitalizations and drug-related problems. Integration of pharmacist counseling into primary care is strongly recommended for sustainable, patient-centered care.

#### Corresponding Author:

Adari E L Lakshmi Vani Sruthi  
Department of Pharmaceutical Sciences, Vignan Institute of Pharmaceutical Technology (A), Duvvada, Visakhapatnam, Andhra Pradesh, India.  
Email: [sruthiadari5@gmail.com](mailto:sruthiadari5@gmail.com)

Copyright © 2025 The Author(s). This is an open access article distributed under the Creative Commons Attribution License, (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 1. INTRODUCTION

Primary care is changing, requiring a multi professional framework to deal with the rising number of chronic non-communicable diseases (NCDs) like hypertension, type 2 diabetes mellitus and cardiovascular conditions [1]. Poor clinical outcomes, hospitalizations and unnecessary healthcare spending are some of the most critical and avoidable determinants of poor medication adherence globally [2]. According to the World Health Organization, it is only in developed countries that about half of chronic illness patients follow prescribed treatments, which is much lower in low-and-middle-income countries (LMICs) [3].

The pharmacists have a distinct and strategically beneficial location in the healthcare chain. They are able to provide specialized counseling to patients on pharmacotherapy, medication safety and patient behavior due to the specialized knowledge they have on the clinical and behavioral aspects of medication management [4]. Pharmacist interactions may be more frequent, more accessible and patient-centered, unlike episodic interactions between physicians and patients, which makes pharmacist interactions the best option to continually monitor and educate patients with chronic diseases [5].

Pharmacist-led counseling is a wide concept of structured interventions, such as in-depth medication reviews, evaluation of adherence, patient education on disease pathophysiology and drug mechanisms, detection and resolution of drug related problems (DRPs) and motivational interviewing methods of creating self-management [6]. All these activities are a pharmaceutical care philosophy, a philosophy that focuses on a responsible approach to administering drug therapy to bring about certain outcomes that enhance the quality of life of a patient [7].

Although there is an increasing amount of data concerning the clinical efficacy of pharmacist interventions in tertiary and specialized care environments, little comparative information on the same in primary care environments, especially in the Indian subcontinent, is available [8]. As a primary care, most patients with chronic conditions have the first point of contact with primary care and as such, the most influential environment to preventive and longitudinal pharmacist engagements [9]. Furthermore, the nature of communication between pharmacists and patients and the design of counseling protocols are significantly different in practice settings, which adds heterogeneity to the results of the reported outcomes [10].

The study was thus aimed at assessing the impacts of a protocol based, pharmacist-led counseling intervention on clinical outcomes, medication compliance, patient satisfaction and health care use in patients with chronic illnesses in a primary care clinic based in Mumbai, India. The results will serve to provide evidence-based information that can guide policy and pharmacy practice guidelines and incorporation of clinical pharmacy services in the primary care systems in LMICs.

## 2. RELATED WORK

The history of literature on pharmacist-led counseling is many decades long and represents an evolution of understanding of pharmacists as being an invaluable part of the patient care process. The first attempts to formalize the concept of pharmaceutical care were made by [11], who laid the theoretical foundation of clinical services provided by pharmacists. Later randomized controlled studies showed that the pharmacist intervention in chronic diseases showed a considerable decrease in cardiovascular risk factors, glycemic indices and lipid profiles [12].

Systolic blood pressure was decreased by an average of 7.6 mmHg and diastolic blood pressure was decreased by 3.9 mmHg, compared to usual care, in a landmark systematic review and meta-analysis by [13], which reviewed 39 randomized controlled trials. Subsequent meta-analyses, such as that by [14],

also supported these findings, but in this case the meta-analysis specifically investigated pharmacist interventions in primary care contexts and had a mean effect of 8.1 mmHg reduction in systolic blood pressure of hypertensive patients who participated in structured counseling.

[15] Showed that in an ambulatory care setting, pharmacist-led education and counseling program led to a significant reduction in the levels of HbA1c (-1.6%) and adherence to antidiuretic medications in diabetic patients as opposed to controls. Equally, a survey done in the community pharmacies in the United Kingdom [16] had shown significant changes in glycemic control, self-monitoring behavior and quality of life with the intervention of pharmacists.

In terms of medication adherence, a thorough study [17] has found the pharmacist-based adherence counseling system to be better than standard care in a variety of types of diseases with moderate and substantial effect sizes. The processes that explained the greater-adherence rates were explained by a better patient knowledge, less anxiety connected with medication, better patient-pharmacist relationship and patient-specific follow-up plans [18].

There has been a relative lack of studies that investigate the role of pharmacists in primary care in India. [19] Examined the effect of pharmacist counseling on adherence to antihypertensive medication in an urban Indian cohort and they found that after intervention, statistically significant improvement in the MMAS scores occurred. The study was however limited with single arm design and limited follow-up period. [20] Also implemented a similar study in a South Indian primary care center and reported an increase in blood pressure and patient satisfaction but the intervention was not standardized.

[21] Conducted a systematic review of pharmacist-led interventions in LMICs that revealed the potential of increasing clinical pharmacy activities in resource-constrained environments and pointed to the necessity of methodologically rigorous studies with multi-dimensional outcome measurement. The current research fills this gap with a randomized controlled trial study design with extensive endpoint assessment in a primary care environment.

### 3. METHODOLOGY

#### 3.1 Study Design and Setting

It was a prospective, single-center, open-label randomized controlled trial that was carried out at a primary care clinic in Mumbai, India, in the timeframe of January 2023 to June 2023.

#### 3.2 Participant Selection

The participants were eligible adults with one or more chronic conditions (hypertension, type 2 diabetes or dyslipidemia), who took two or more medications on a regular basis and visited the primary care clinic as part of regular follow-ups and were willing to undergo monthly counseling sessions. The exclusion criteria were that they had to be pregnant or lactating, severely cognitively impaired, terminal, already enrolled on pharmaceutical care programs and had a surgical procedure planned during the study time.

The 240 patient sample (120 in each arm) was estimated using an anticipated 20% increase in the rate of adherence, an alpha of 0.05 and a statistical power of 80% with 10% dropout rate. Computer-generated block randomization with stratification by primary diagnosis was used to randomize the participants 1:1.

#### 3.3 Intervention Protocol

The intervention group patients were given structured pharmacist-guided counseling in a team of two clinical pharmacists who have postgraduate qualifications. The counseling protocol was a combination of six components as outlined in Table 1. The counseling sessions were provided through the face-to-face mode with a follow up by telephone where face-to-face visits were impossible. The control group patients had conventional care, involving consultations with the physicians and dispensing services without any organized pharmacist feedback.

**Table 1.** Components of the Pharmacist-Led Counseling Intervention

Counseling Component	Frequency	Duration (Min)	Delivery Mode
Medication Review	Monthly	20-30	Face-to-face
Adherence Counseling	Bi-weekly	15-20	Face-to-face/Phone
Disease Education	Monthly	20-25	Group/Individual
Side Effect Monitoring	Monthly	10-15	Phone/In-person
Lifestyle Modification	Quarterly	30-40	Face-to-face
Follow-up Coordination	As needed	10-15	Phone/EHR

The intervention was to be comprehensive and flexible as indicated in Table 1 and incorporated clinical, educational and behavioral aspects of patient care. All the elements were recorded in a pharmacist-patient record and care summaries were sent to the physicians treating them through the electronic health record system.

### 3.4 Outcome Measures

The main outcome was adherence to medication, measured with the help of the validated eight-item Morisky Medication Adherence Scale (MMAS-8) at the baseline and six months follow-up. Secondary outcomes comprised systolic blood pressure, HbA1c, hospital admission, patient satisfaction (Likert scale, 0-10) and the amount of drug-related problems that could be identified and solved per patient.

### 3.5 Data Analysis

The SPSS version 26.0 (IBM Corp, Armonk, NY) was used to conduct statistical analyses. Mean  $\pm$  standard deviation was used to describe the continuous variables and independent samples t-tests were used to compare the variables. Chi-square tests were used to test the categorical variables. Paired t-tests were used to test within-group changes. There was a p-value < 0.05 that was deemed to be statistically significant. The intention-to-treat analysis took into consideration withdrawals.

## 4. RESULTS AND DISCUSSION

### 4.1 Baseline Characteristics

The enrolment and randomization of 240 patients were done, 228 (95% of the participants) of the patients followed up at the sixth month (12 withdrawals: 6 each arm). The baseline demographic and clinical characteristics were also similar in both groups with no statistical significance between them as indicated in Table 2, which confirms that the randomization was effective.

**Table 2.** Baseline Demographic and Clinical Characteristics of Study Participants

Characteristic	Control (n=120)	Intervention (n=120)	P-Value
Mean Age (years)	54.3 $\pm$ 11.2	53.8 $\pm$ 10.9	0.724
Female (%)	58.3%	61.7%	0.582
Hypertension (%)	72.5%	71.7%	0.873
Type 2 Diabetes (%)	48.3%	50.0%	0.791
Polypharmacy ( $\geq$ 5 meds)	64.2%	65.8%	0.804
Low Health Literacy (%)	31.7%	33.3%	0.782

The average age of the respondents was about 54 years and about 60% of the respondents were females. The most common comorbidity was hypertension (shown in more than 70% of the participants in both arms) and type 2 diabetes and poly-pharmacy. These attributes indicate the chronic disease burden that would be observed in urban primary care in India.

## 4.2 Clinical Outcomes

Table 3 shows the primary and secondary outcome results at 6 months follow-up. The intervention group, as indicated in Table 3, had statistically significant improvement in all the measured outcomes as compared to the baseline and the control group had slight improvements.

Table 3. Clinical Outcomes at Six-Month Follow-up in the Intervention Group

Outcome Measure	Baseline	6-Month Follow-Up	Change	P-Value
Medication Adherence (%)	61.2	84.7	+23.5	<0.001
Systolic BP (mmHg)	148.6 ± 14.2	132.4 ± 11.8	-16.2	<0.001
HbA1c (%)	8.4 ± 1.3	7.1 ± 1.0	-1.3	<0.001
Hospital Admissions (n)	0.48/patient	0.21/patient	-56.3%	0.002
Patient Satisfaction Score	6.8/10	8.9/10	+2.1	<0.001
Drug-Related Problems (n)	2.3/patient	0.9/patient	-60.9%	<0.001

The intervention group had a significant and sustained improvement in medication adherence, with the percentage changing by 23.5 (61.2% to 84.7%,  $p < 0.001$ ). This is in line with the results obtained [17], [13] who also reported large adherence increases after pharmacist-led programs. The intervention group had a reduction in systolic blood pressure by an average of 16.2 mmHg ( $p < 0.001$ ) which is a significant reduction compared to the meta-analysis [14]. This improved effect could be explained by the synergy of adherence improvement counseling and lifestyle modification counseling that is incorporated in the protocol. Likewise, mean HbA1c decreased by 1.3% ( $p < 0.001$ ), which is also similar with the results of Al [15] and is in favor of the glycemic control advantages of systemic pharmacist involvement.

## 4.3 Healthcare Utilization and Safety

There was a reduction in the rate of hospital admission by 56.3% in intervention group compared to the study period ( $p = 0.002$ ). Such significant decrease highlights the preventative importance of pharmacist counseling in the identification of clinical deterioration in its early stages and prevention of unnecessary hospitalizations. By 60.9% per patient ( $p < 0.001$ ), the count of drug-related issues (sub therapeutic dosing, adverse drug reactions, drug-drug interactions) was reduced, which is the result of the proactive approach of the pharmacist to diagnosing and solving the problem with medication.

The Figure 1 shows the trend of increasing medication adherence over the six-month period in the two study groups. As Figure 1 indicates, the intervention group has exhibited a steady and statistically significant increasing trend in adherence starting the first month on and continuing through to the end of the study period, but the control group has been fairly stable in adherence over the course of the study.

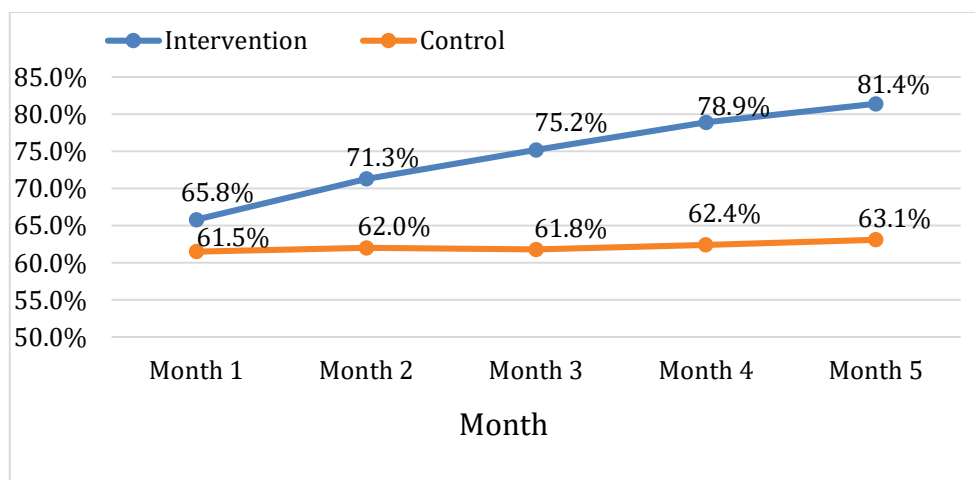


Figure 1. Monthly Progression of Medication Adherence Rates (%) in the Intervention and Control Groups over the Six-Month Study Period the Intervention Group Demonstrates a Consistent Upward Trajectory Compared to the Stable Control Group

Figure 2 shows a schematic diagram of a counseling workflow that was conducted by the pharmacist, which has been used in this study. As seen in Figure 2, the process starts with initial patient assessment and continues through an organized counseling process of medication review, adherence evaluation, education delivery and multidisciplinary referral which ends with a follow up loop that ensures continuity of care.



Figure 2. Schematic Workflow Diagram of the Pharmacist-Led Counseling Process the Seven-Step Framework Guides the Clinical Pharmacist from Patient Enrollment through Ongoing Follow-Up, Ensuring Continuity and Individualization of Care

#### 4.4 Patient Satisfaction

The mean of the scores of patient satisfaction increased considerably by 6.8 to 8.9 out of 10 ( $p < 0.001$ ) in the intervention group. The qualitative feedback revealed that the patients appreciated the time spent with the pharmacists, the focus on effective communication and individual attention of the pharmacists. These results resonate with [20] and the increasing literature that therapeutic alliances between patients and pharmacists do have a role to play in the patient experience.

#### 4.5 Comparative Outcomes Summary

The size of the improvement of all primary and secondary outcome domains in the intervention group are comparatively summarized in Figure 3. The most significant relative changes were in hospital admissions (-56.3%) and drug-related problems (-60.9%), which shows the extensive clinical and safety outcomes of the pharmacist-led counseling program Figure 3.

## Outcomes

Outcome Domain	Relative Change	% Change
Medication Adherence	■ ■ ■ ■ ■	+23.5%
Systolic Blood Pressure	■ ■ ■ ■	-10.9%
HbA1c	■ ■ ■	-15.5%
Hospital Admissions	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	-56.3%
Patient Satisfaction	■ ■ ■ ■ ■ ■	+30.9%
Drug-Related Problems	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	-60.9%
Drug-Related Problems	■ ■ ■ ■ ■	-60.9%

**Figure 3.** Comparative Summary of Relative Percentage Changes in Primary and Secondary Outcomes at Six-Month Follow-Up in the Pharmacist-Led Counseling Intervention Group Positive Values Indicate Improvement Negative Values Indicate Reduction (Favorable for BP, HbA1c, Admissions and DRPs)

### 4.6 Discussion

The outcomes of this trial support the significant clinical importance of the integration of structured pharmacist-led counseling into routine primary care. The extent of the improvements, especially in adherence, blood pressure, glycemic control and hospital admissions, are similar to and in some areas larger than, those reported in the past both in LMICs and in the high-income countries [13], [14] and [15].

The decrease in the number of drug-related issues is especially notable, since DRPs are a cause of clinical harm and healthcare expenditure which is often underestimated. This is because the overall drug review ability of the pharmacist allowed it to detect drug-drug interactions, inappropriate dosage and inappropriate choice of treatment early enough before it could be overlooked during routine care encounters. The result contributes to the argument in favor of enlarging the clinical pharmacy practice in primary care environments with resource limitations as a patient safety measure [21].

The informational and relational aspects of patient counseling by the pharmacist are reflected in patient satisfaction gains. Patients indicated increased awareness about their conditions, more confidence in self-management of their medication and more involvement in self-care, which are the features of long-term behavior change and enhanced long-term outcomes [22], [23]. These results probably were due to the application of motivational interviewing strategies, as well as culturally relevant educational tools.

Some of the strengths of this study are that it is a randomized controlled trial, has an extensive outcome measure, retention of 95% and real world primary care environment [24], [25]. Limitations are single-center design, open-allocation which can introduce a performance bias and a self-reported measure of adherence (MMAS-8). Future studies are to examine the cost-effectiveness of pharmacist-led counseling programs and examine their sustainability over the long term (after six months).

## 5. CONCLUSION

This randomized controlled trial has solid evidence that structured pharmacist-led counseling is much better in enhancing medication adherence, clinical outcomes, patient satisfaction and healthcare safety among patients with chronic diseases in primary care setting. The intervention resulted in significant systolic blood pressure, HbA1c, hospital admission and drug-related issues decreases, a significant increase in adherence rates and patient satisfaction scores.

The results propose formalizing and scaling pharmacist-led counseling services to primary care systems, especially in LMICs where the chronic disease burden is the greatest and clinical pharmacy services are underutilized. Healthcare policy makers, administrators of hospitals and medical educators

need to work together to incorporate clinical pharmacists into primary care teams, develop standardized counseling guidelines and invest in training and infrastructure to facilitate the important healthcare role.

Further multi-center studies with extended follow-up and health economic evaluations and patient-reported quality of life are justified to better define the overall scope and sustainability of the pharmacist-led counseling advantages of diverse primary care groups.

### Acknowledgments

The authors have no specific acknowledgments to make for this research.

### Funding Information

This research project was an institutional project; therefore, no funding was provided.

### Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Adari E L Lakshmi Vani Sruthi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

### Conflict of Interest Statement

All authors declare no conflict of interest.

### Informed Consent

No formal informed consent was obtained as this was a community-based project, participation was voluntary and only those who were interested were included in the study.

### Ethical Approval

The study was conducted in compliance with the ethical principles outlined in the Declaration of Kshema Independent Ethics Committee and approved by the relevant institutional authorities.

### Data Availability

The data that support the findings of the study were available from the corresponding author upon reasonable request.

### REFERENCES

- [1] R. Nugent, 'Chronic diseases in developing countries: health and economic burdens', *Ann. N. Y. Acad. Sci.*, vol. 1136, no. 1, pp. 70-79, 2008. [doi.org/10.1196/annals.1425.027](https://doi.org/10.1196/annals.1425.027)
- [2] L. Osterberg and T. Blaschke, 'Adherence to medication', *N. Engl. J. Med.*, vol. 353, no. 5, pp. 487-497, Aug. 2005. [doi.org/10.1056/NEJMr050100](https://doi.org/10.1056/NEJMr050100)
- [3] M. A. Chisholm-Burns et al., 'US pharmacists' effect as team members on patient care: systematic review and meta-analyses', *Med. Care*, vol. 48, no. 10, pp. 923-933, Oct. 2010. [doi.org/10.1097/MLR.0b013e3181e57962](https://doi.org/10.1097/MLR.0b013e3181e57962)
- [4] C. D. Hepler and L. M. Strand, 'Opportunities and responsibilities in pharmaceutical care', *Am. J. Health. Syst. Pharm.*, vol. 47, no. 3, pp. 533-543, Mar. 1990. [doi.org/10.1093/ajhp/47.3.533](https://doi.org/10.1093/ajhp/47.3.533)
- [5] V. Harris and V. Anand, 'From academia to Zimbabwe: Waterloo pharmacy students go global', *Can. Pharm. J. (Ott.)*, vol. 145, no. 5, pp. 215-217, Sept. 2012. [doi.org/10.3821/145.5.cpj215](https://doi.org/10.3821/145.5.cpj215)


- [6] B. Starfield, L. Shi and J. Macinko, 'Contribution of primary care to health systems and health', *Milbank Q.*, vol. 83, no. 3, pp. 457-502, 2005. [doi.org/10.1111/j.1468-0009.2005.00409.x](https://doi.org/10.1111/j.1468-0009.2005.00409.x)
- [7] The PLOS ONE Staff, 'Correction: Adherence to chemoprophylaxis and Plasmodium falciparum anti-circumsporozoite seroconversion in a prospective cohort study of dutch short-term travelers', *PLoS One*, vol. 9, no. 8, p. e106147, Aug. 2014. [doi.org/10.1371/journal.pone.0106147](https://doi.org/10.1371/journal.pone.0106147)
- [8] J. A. Generali, M. A. Danish and S. E. Rosenbaum, 'Knowledge of and attitudes about adverse drug reaction reporting among Rhode Island pharmacists', *Ann. Pharmacother.*, vol. 29, no. 4, pp. 365-369, Apr. 1995. [doi.org/10.1177/106002809502900404](https://doi.org/10.1177/106002809502900404)
- [9] V. Santschi, A. Chioloro, B. Burnand, A. L. Colosimo and G. Paradis, 'Impact of pharmacist care in the management of cardiovascular disease risk factors: a systematic review and meta-analysis of randomized trials', *Arch. Intern. Med.*, vol. 171, no. 16, pp. 1441-1453, Sept. 2011. [doi.org/10.1001/archinternmed.2011.399](https://doi.org/10.1001/archinternmed.2011.399)
- [10] B. Darpo et al., 'Evaluation of the QT effect of a combination of piperazine and a novel anti-malarial drug candidate OZ439, for the treatment of uncomplicated malaria', *Br. J. Clin. Pharmacol.*, vol. 80, no. 4, pp. 706-715, Oct. 2015. [doi.org/10.1111/bcp.12680](https://doi.org/10.1111/bcp.12680)
- [11] N. R. Al Mazroui, M. M. Kamal, N. M. Ghabash, T. A. Yacout, P. L. Kole and J. C. McElnay, 'Influence of pharmaceutical care on health outcomes in patients with Type 2 diabetes mellitus', *Br. J. Clin. Pharmacol.*, vol. 67, no. 5, pp. 547-557, May 2009. [doi.org/10.1111/j.1365-2125.2009.03391.x](https://doi.org/10.1111/j.1365-2125.2009.03391.x)
- [12] Z. Putz et al., 'Autonomic dysfunction and circadian blood pressure variations in people with impaired glucose tolerance', *Diabet. Med.*, vol. 30, no. 3, pp. 358-362, Mar. 2013. [doi.org/10.1111/dme.12111](https://doi.org/10.1111/dme.12111)
- [13] R. Nieuwlaat et al., 'Interventions for enhancing medication adherence', *Cochrane Database Syst. Rev.*, vol. 2014, no. 11, p. CD000011, Nov. 2014. [doi.org/10.1002/14651858.CD000011.pub4](https://doi.org/10.1002/14651858.CD000011.pub4)
- [14] H. P. McDonald, A. X. Garg and R. B. Haynes, 'Interventions to enhance patient adherence to medication prescriptions: scientific review', *JAMA*, vol. 288, no. 22, pp. 2868-2879, Dec. 2002. [doi.org/10.1001/jama.288.22.2868](https://doi.org/10.1001/jama.288.22.2868)
- [15] H. Lourens, 'Improved sleep and rehabilitation in a post-traumatic stress disorder patient after commencement of prazosin', *J. Pharm. Pr. Res.*, vol. 48, no. 6, pp. 550-553, Dec. 2018. [doi.org/10.1002/jppr.1391](https://doi.org/10.1002/jppr.1391)
- [16] Z. Cernickova, J. Dohnal and J. Saloun, 'Marketing authorisation expenses for veterinary medicinal products in northern Europe', *Indian J. Pharm. Sci.*, vol. 80, no. 3, 2018. [doi.org/10.4172/pharmaceutical-sciences.1000373](https://doi.org/10.4172/pharmaceutical-sciences.1000373)
- [17] K. R. Lorig and H. Holman, 'Self-management education: history, definition, outcomes and mechanisms', *Ann. Behav. Med.*, vol. 26, no. 1, pp. 1-7, Aug. 2003. [doi.org/10.1207/S15324796ABM2601\\_01](https://doi.org/10.1207/S15324796ABM2601_01)
- [18] D. E. Morisky, A. Ang, M. Krousel-Wood and H. J. Ward, 'Predictive validity of a medication adherence measure in an outpatient setting', *J. Clin. Hypertens. (Greenwich)*, vol. 10, no. 5, pp. 348-354, May 2008. [doi.org/10.1111/j.1751-7176.2008.07572.x](https://doi.org/10.1111/j.1751-7176.2008.07572.x)
- [19] G. Guyatt et al., 'GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables', *J. Clin. Epidemiol.*, vol. 64, no. 4, pp. 383-394, Apr. 2011. [doi.org/10.1016/j.jclinepi.2010.04.026](https://doi.org/10.1016/j.jclinepi.2010.04.026)
- [20] P. K. Whelton et al., '2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation and management of high blood pressure in adults: A report of the American college of cardiology/American heart association task force on clinical practice guidelines', *Hypertension*, vol. 71, no. 6, pp. e13-e115, June 2018. [doi.org/10.1161/HYP.0000000000000076](https://doi.org/10.1161/HYP.0000000000000076)
- [21] N. A. ElSayed et al., '1. Improving care and promoting health in populations: Standards of care in diabetes-2023', *Diabetes Care*, vol. 46, no. Supple 1, pp. S10-S18, Jan. 2023. [doi.org/10.2337/dc23-S001](https://doi.org/10.2337/dc23-S001)

- [22] L. Nagy, T. H. Lee and A. B. Kay, 'Neutrophil chemotactic activity in antigen-induced late asthmatic reactions', *N. Engl. J. Med.*, vol. 306, no. 9, pp. 497-501, Mar. 1982. [doi.org/10.1056/NEJM198203043060901](https://doi.org/10.1056/NEJM198203043060901)
- [23] K. K. Viktil, H. S. Blix, T. A. Moger and A. Reikvam, 'Polypharmacy as commonly defined is an indicator of limited value in the assessment of drug-related problems', *Br. J. Clin. Pharmacol.*, vol. 63, no. 2, pp. 187-195, Feb. 2007. [doi.org/10.1111/j.1365-2125.2006.02744.x](https://doi.org/10.1111/j.1365-2125.2006.02744.x)
- [24] B. Lerner, J. S. Roberts, M. Shwartz, D. L. Roter, R. C. Green and J. A. Clark, 'Distinct communication patterns during genetic counseling for late-onset Alzheimer's risk assessment', *Patient Educ. Couns.*, vol. 94, no. 2, pp. 170-179, Feb. 2014. [doi.org/10.1016/j.pec.2013.10.019](https://doi.org/10.1016/j.pec.2013.10.019)
- [25] M. G. Neuman et al., 'Alcoholic liver disease: a synopsis of the Charles Lieber's Memorial Symposia 2009-2012', *Alcohol Alcohol*, vol. 49, no. 4, pp. 373-380, July 2014. [doi.org/10.1093/alcalc/agu021](https://doi.org/10.1093/alcalc/agu021)

**How to Cite:** Adari E L Lakshmi Vani Sruthi. (2025). Pharmacist-led counseling and its effect on patient outcomes in primary care. *Journal of Community Pharmacy Practice (JCPP)*, 5(2), 11-20. <https://doi.org/10.55529/jcpp.52.11.20>

#### BIOGRAPHY OF AUTHOR



**Adari E L Lakshmi Vani Sruthi** , is a researcher and pharmacy professional from the Department of Pharmaceutical Sciences, Vignan Institute of Pharmaceutical Technology (A), Visakhapatnam, Andhra Pradesh, India. Her academic interests focus on clinical pharmacy, patient counseling, medication adherence and chronic disease management in primary care settings. She is particularly interested in pharmacist-led interventions that improve patient outcomes and healthcare quality. Sruthi has actively participated in clinical research projects and is committed to advancing pharmaceutical care practices and promoting patient-centered healthcare services. Email: [sruthiadari5@gmail.com](mailto:sruthiadari5@gmail.com)