STM JOURNALS

Research & Reviews: A Journal of
Pharmacology

https://journals.stmjournals.com/rrjop

ISSN: 2230-9861 (Online)
ISSN: 2349-1299 (Print)
Volume 14, Issue 3, 2024
September–December
DOI (Journal): 10.37591/RRJoP

Research RRJoP

A Community-Based Study to Assess the Impact of Pharmacist Led Home Medication Review in Patients with Diabetes Mellitus in Dakshina Kannada

Shynia Neola Dsouza[1], Sulalath U.[2], Ramdas Bhat[3,*], Swathi Gopinath[4], Krishnananda Kamath[5]

Abstract

Diabetes mellitus is a chronic metabolic disorder with the condition where there is an abnormally high blood glucose level. Home medication review (HMR) is a patient-centered process that provides the effective and quality use of medication at the patient's home. According to a study, nearly 50% of Type II diabetes fail to recite adequate glycemic control due to poor management of anti-diabetic medications. So, a community-based interventional study was conducted on 150 subjects residing in various parts of Dakshina Kannada to assess the knowledge, attitude, and practices on the management of anti-diabetic medications at home in diabetes patients through HMR after obtaining ethical committee approval. Information regarding medication adherence, medication errors, and drug-related problems was collected through systematically designed data collection forms and patient information leaflets through home medication review. Questionnaires were prepared and given to patients before and after intervention. The low-adherent patients were given PIL and counseled before the post-interventional study. Among 150 subjects 85(56.6%) subjects in medication adherence, 135(90%) subjects in modification of dose, 115 (76.7%) subjects in time modification, 115(76.7%) subjects in the knowledge of storage had shown improvement after the interventions (PIL and counseling). So, it was concluded that the pharmacist intervention helped improve the overall diabetes management through HMR, thereby leading to a better health care outcome.

Keywords: Home medication review (HMR), medication adherence, diabetes mellitus, drug-related problems (DRPS), community-based study

*Author for Correspondence
Ramdas Bhat
E-mail: ramdas21@gmail.com

[1–2,4]PG Scholar, Department of Pharmacy Practice, Srinivas College of Pharmacy, Valachil, Farangipete Post, Mangalore, Karnataka, India.
[3]Associate Professor, Department of Pharmacology, Srinivas College of Pharmacy, Valachil, Farangipete Post, Mangalore, Karnataka, India.
[5]Professor, Department of Pharmaceutics, Srinivas College of Pharmacy, Valachil, Farangipete Post, Mangalore, Karnataka, India.

Received Date: September 16, 2024
Accepted Date: September 30, 2024
Published Date: October 19, 2024

Citation: Shynia Neola Dsouza, Sulalath U., Ramdas Bhat, Swathi Gopinath, Krishnananda Kamath. A Community-Based Study to Assess the Impact of Pharmacist Led Home Medication Review in Patients with Diabetes Mellitus in Dakshina Kannada. Research & Reviews: A Journal of Pharmacology. 2024; 14(3): 29–34p.

INTRODUCTION

Home medication review (HMR) is a crucial service designed to assist consumers living at home in preventing medication-related problems and maximizing the benefits of their medication regimens. This comprehensive process involves multiple stakeholders, including the consumer, their clinicians, pharmacy, and general practitioners, all working together in the patient's home setting. The importance of HMR cannot be overstated, particularly considering the prevalence of medication errors and drug-food interactions that often arise when patients fail to take their medications as prescribed. These issues can have serious consequences, potentially leading to alterations in dosage or even the complete termination of necessary medications. The primary objective of HMR is to enhance medication

adherence by identifying and mitigating drug-related problems (DRPs), thereby improving overall patient outcomes [1].

Diabetes mellitus, a chronic metabolic disorder, is characterized by abnormally high blood glucose levels and has been recognized as one of the oldest known diseases affecting humanity. This condition arises when the body either fails to produce insulin, produces insufficient amounts, or when the insulin produced is not as effective as it should be. The two most prevalent forms of diabetes are type 1 diabetes, an autoimmune disorder accounting for approximately 5% of cases, and type 2 diabetes, which is often associated with obesity and represents about 95% of all cases. The development of diabetes is influenced by a complex interplay of factors, including an individual's lifestyle choices, particularly their physical activity levels and dietary habits, as well as genetic predisposition [2].

HMR is fundamentally a patient-centered process that aims to ensure the effective and quality use of medications within the patient's home environment. This systematic and detailed assessment of a patient's medication regimen is specifically designed to identify and prevent medication errors, addressing a critical aspect of patient safety and care quality. By conducting these reviews in the patient's home, healthcare professionals can gain valuable insights into the real-world challenges and contexts that may impact medication use [3]. The process of HMR is invaluable in identifying a wide range of potential DRPs, including adverse drug reactions, drug interactions, untreated indications, subtherapeutic dosing, improper drug selection, and drug duplication. By addressing these issues, HMR plays a pivotal role in improving medication adherence behaviors and enhancing the health-related quality of life for patients [4].

The global impact of diabetes is starkly illustrated by the situation in India, which currently holds the unenviable position of having the second-highest number of individuals with diabetes worldwide. As of 2019, approximately 77 million people in India were living with diabetes, a number that is projected to surge to an alarming 134 million by 2045. This dramatic increase underscores the urgent need for effective management strategies and interventions. The gravity of the diabetes epidemic is further emphasized by the World Health Organization’s classification of diabetes as the ninth leading cause of death globally, highlighting its significant contribution to mortality rates worldwide [5].

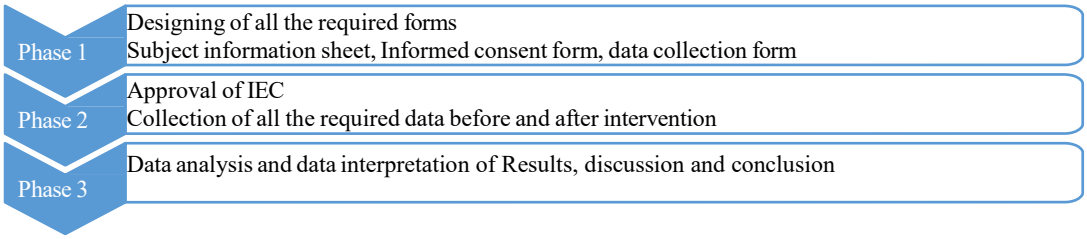
One of the most pressing challenges in diabetes management is the issue of poor medication adherence. Studies have shown that nearly half of all patients with type 2 diabetes fail to achieve adequate glycemic control, largely due to non-adherence to prescribed medication regimens. This widespread problem of poor adherence has far-reaching consequences, including increased mortality rates, elevated healthcare costs, more frequent emergency room visits and hospitalizations, and a higher incidence of diabetes-related complications. The economic and human costs of these outcomes underscore the critical importance of addressing medication adherence in diabetic populations [6].

Considering these challenges, this research aims to assess the impact of pharmacist-led home medication reviews on patients with diabetes mellitus in Dakshina Kannada. By focusing on this specific geographic area, the study seeks to provide valuable insights into the effectiveness of HMR in improving medication adherence, reducing DRPs, and ultimately enhancing the management of diabetes in this population. The study will employ established tools such as the Morisky Medication Adherence Scale-8 (MMAS-8) to assess and improve medication adherence and utilize the Hepler-Strand classification to identify and resolve drug-related problems. Additionally, the research will focus on identifying and preventing medication errors, a critical aspect of patient safety in diabetes management. By comprehensively examining these aspects of medication use and management in the home setting, this study aims to contribute meaningful data and insights that can inform and improve diabetes care practices, not only in Dakshina Kannada but potentially in broader contexts as well.

METHODOLOGY

a. *Study design:* Interventional study.
b. *Study site:* Community level within Dakshina Kannada district.
c. *Study duration:* 4 months (August 2022 to November 2022).
d. *Sample size:* 150 participants.
e. *Ethical clearance:* Approved by the Institutional Ethics Committee of Srinivas Institute of Medical Science, Mangalore.
f. *Study Criteria*
   - *Inclusion:* Patients of either gender, aged above 18 years, with diabetes mellitus.
   - *Exclusion:* Patients below 18 years, pregnant/lactating women, non-diabetics.
g. *Data collection:* Questionnaires in Kannada and English.
h. *Data analysis:* Microsoft Excel 2017 and paired t-test.

OPERATION MODALITY



RESULT

The study examined participant's demographic details, social history, medication adherence, drug-related problems (DRPs), medication errors, and storage practices of anti-diabetic medications and insulin before and after an intervention. The group consisted of 51% males and 49% females, with most aged between 41–60 years (52.66%). Social habits showed that 90.6% had no history of smoking, alcohol, or tobacco use. Prior to the intervention, 64.7% had low adherence to medication, which improved significantly after the intervention, with the number of participants showing high adherence increasing from 15.3% to 56.6%.

There was also a marked reduction in DRPs and medication errors post-intervention. Untreated indications, improper drug selection, sub-therapeutic dosages, and adverse reactions saw significant decreases. Medication errors, particularly prescribing, dispensing, and administration errors, were reduced substantially, with compliance errors dropping from 80.66% to 43.33%. The data suggest that the intervention played a critical role in addressing these issues, contributing to better patient outcomes (Table 1).

Table 1. Summary of changes in medication adherence, drug-related problems, medication errors, and storage practices before and after intervention.

Category	Pre-Intervention	Post-Intervention	P-Value
Demographic details			
Male	76 (51%)	–	–
Female	74 (49%)	–	–
Age <40	10 (6.6%)	–	–
Age 41–60	79 (52.66%)	–	–
Age >60	61 (40.66%)	–	–
Social history			
Alcoholic	2 (1.4%)	–	–
Smoker	9 (6%)	–	–
Tobacco user	3 (2%)	–	–

None	136 (90.6%)	–	–
Medication adherence (MMAS-8)			
Low adherence (<6)	97 (64.7%)	40 (26.7%)	<0.05
Medium adherence (6 < 8)	30 (20%)	25 (16.7%)	<0.05
High adherence (≥8)	23 (15.3%)	85 (56.6%)	<0.05
Drug related problems (DRPs)			
Untreated indication	5	1	<0.05
Improper drug selection	2	0	<0.05
Sub-therapeutic dosage	4	1	<0.05
Failure to receive drugs	121	65	<0.05
Over dosage	8	2	<0.05
Adverse reactions	30	12	<0.05
Drug interactions	25	10	<0.05
Drug use without indications	0	0	<0.05
Medication errors			
Prescribing error	14 (9.33%)	3 (2%)	<0.05
Dispensing error	2 (1.3%)	0	<0.05
Administration error (anti-diabetic drugs)	186	164	<0.05
Administration error (insulin)	24	14	<0.05
Monitoring error	10	3	<0.05
Compliance error	121 (80.66%)	65 (43.33%)	<0.05
Storage of anti-diabetic medications			
Kitchen	13 (8.6%)	8 (5.3%)	–
Refrigerator	8 (5.3%)	0	–
House rooms	42 (27.8%)	35 (23.3%)	–
Cupboard	83 (55%)	106 (70.6%)	–
Bathroom	4 (2.6%)	1 (0.6%)	–
Storage of insulin			
Kitchen	2 (12.5%)	0	–
Refrigerator	8 (50%)	13 (81.25%)	–
House rooms	2 (12.5%)	1 (6.25%)	–
Cupboard	3 (18.75%)	2 (12.5%)	–
Bathroom	1 (6.25%)	0	–
Pre-intervention and post-intervention data are compared to assess the effectiveness of the intervention. P-values indicate the statistical significance of changes observed.			

Storage practices for both anti-diabetic medications and insulin improved after the intervention. Cupboard storage of anti-diabetic drugs increased from 55% to 70.6%, while improper storage in places like the kitchen and bathroom decreased. Similarly, insulin storage in refrigerators rose from 50% to 81.25%, while inappropriate storage was nearly eliminated. These results underscore the importance of patient education and targeted interventions in enhancing diabetes care management.

DISCUSSION

Home medication review (HMR) plays a crucial role in preventing medication-related problems and maximizing the benefits of medication regimens for diabetes patients living at home [6]. A study revealed that nearly 50% of Type II diabetes patients fail to achieve adequate glycemic control due to poor management of anti-diabetic medications [1]. To address this issue, a community-based interventional study was conducted to assess and improve medication adherence in diabetes patients using Morisky scale-8. The study also aimed to identify and resolve drug-related problems (DRPs) using Hepler-strand classification, prevent medication errors, and review patients' storage methods for anti-diabetic medications at home [7–10].

The study involved 150 subjects with diabetes mellitus. Pre-intervention results using the Morisky scale-8 showed 97 people with low adherence, 30 with medium adherence, and 23 with high adherence. Post-intervention, these numbers significantly improved to 40, 25, and 85 respectively, demonstrating the effectiveness of the intervention in enhancing medication adherence [1]. The study

identified 195 DRPs pre-intervention, including untreated indications, improper drug selection, sub-therapeutic doses, overdosing, failure to receive drugs, adverse drug reactions (ADRs), and drug interactions [11–15]. Post-intervention, there was a notable reduction in all categories of DRPs [16]. The most common DRP was failure to receive drugs, affecting 121 (80.6%) subjects' pre-intervention, which decreased to 65 (43.3%) post-intervention.

Medication errors were also assessed, including prescribing, dispensing, administration, monitoring, and compliance errors. The study showed significant improvements in reducing these errors post-intervention [7]. For instance, prescribing errors decreased from 14 (9.33%) to 3 (2%), and administration errors related to self-modification of anti-diabetic drug doses reduced from 50 (33.3%) to 15 (10%). The storage of anti-diabetic medications was evaluated as well, with notable improvements observed post-intervention, particularly for insulin storage. Initially, only 6 (37.5%) out of 16 insulin users stored it correctly in the refrigerator, which increased to 13 (81.25%) after the intervention. In conclusion, the study demonstrated that pharmacist intervention through HMR was highly effective in reducing medication non-adherence, DRPs, and medication errors, and improving proper storage of anti-diabetic drugs, ultimately contributing to better diabetes management for patients at home.

MERITS

This community-based study addresses a critical gap between patients and healthcare providers that often arises due to a lack of comprehensive pharmaceutical care. Its interventional nature allows for direct education of subjects, providing them with essential knowledge about diabetes and its management, including proper drug storage techniques. Furthermore, the focus on home medication review for diabetes patients is a relatively rare approach in community-based studies, making this research particularly valuable.

LIMITATIONS

The study has two main limitations that should be acknowledged. First, the small sample size may limit the generalizability of the findings to larger populations. Second, there is a potential for information bias, which could affect the accuracy and reliability of the data collected.

FUTURE PROSPECTIVES OF THE STUDY

This study lays the groundwork for more extensive research in the field. A key prospective direction would be to conduct a similar study with a significantly larger population. This expansion would yield more statistically robust and precise data, which could prove invaluable for informed decision-making in diabetes management strategies. By increasing the scale of the study, researchers could potentially uncover more nuanced patterns and relationships in medication adherence, drug-related problems, and storage practices among diabetes patients. Such comprehensive data could have far-reaching implications for improving diabetes care protocols and patient outcomes in community settings.

CONCLUSION

This study on pharmacist-led home medication review (HMR) for diabetes patients in Dakshina Kannada demonstrates the effectiveness of targeted interventions in improving diabetes management. Using a comprehensive approach that assessed medication adherence, drug-related problems, medication errors, and storage practices, the research showed significant improvements post-intervention. The study highlights the crucial role of pharmacists in community healthcare, particularly in managing chronic conditions like diabetes. These findings suggest that integrating HMR into routine diabetes care could be a promising strategy for enhancing patient education, improving medication management, and ultimately achieving better health outcomes for individuals with diabetes mellitus.

Conflict of Interest
None.
Financial Support
None.
Ethical Statement
This research, involving human volunteers, was conducted in strict accordance with the ethical guidelines and approval granted by the Institutional Ethics Committee of Srinivas College of Pharmacy, Mangalore.

REFERENCES

1. Rosli MR, Neoh CF, Wu DB, et al. Evaluation of home medication review for patients with type 2 diabetes mellitus by community pharmacists: a randomized controlled trial. Pharm Pract (Granada). 2021;19(3):2397.
2. Suji G, Sivakami S. Approaches to the treatment of diabetes mellitus: an overview. Cell Mol Biol (Noisy-le-Grand). 2003;49(4):635–9.
3. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. Australas Med J. 2014 Jan 31;7(1):45–8. doi: 10.4066/AMJ.2013.1979.
4. Panda, A; Pradhan, S; Mohapatra, G; Mohapatra, J. Drug-related problems associated with self-medication and medication guided by prescription: A pharmacy-based survey. Ind J Pharma. 2016, Sep–Oct;48(5):p 515–21. . | DOI: 10.4103/0253–7613.190728.
5. Pradeepa, R; Mohan, V. Epidemiology of type 2 diabetes in India. Ind l of Ophtha. 2021, Nov;69(11):p2932–38. | DOI: 10.4103/ijo.IJO_1627_21.
6. Polonsky WH, Henry RR. Poor medication adherence in type 2 diabetes: recognizing the scope of the problem and its key contributors. Patient Prefer Adherence. 2016;10:1299–307. doi:10.2147/PPA.S106821.
7. Chandrasekhar D, Joseph E, Ghaffoor FA, et al. Role of pharmacist led home medication review in community setting and the preparation of medication list. Clin Epidemiol Glob Health. 2019;7(1):66–70. https://doi.org/10.1016/j.cegh.2018.01.002
8. Papastergiou J, Zervas J, Li W, et al. Home medication reviews by community pharmacists: reaching out to homebound patients. Can Pharm J (Ott). 2013;146(3):139–42. https://doi.org/10.1177/1715163513487830
9. Liou, Wen-Shyong, Huang, Shih-Ming; Lee, Wei-Hsin BSa; Chang, Yen-Lin MSa; Wu, Ming-Fen BSa. The effects of a pharmacist-led medication review in a nursing home: A randomized controlled trial. Medicine. 2021, Dec;100(48):p e28023. DOI: 10.1097/MD.0000000000028023.
10. Holland R, Lenaghan E, Harvey I, et al. Does home-based medication review keep older people out of hospital? The HOMER randomized controlled trial. BMJ. 2005;330(7486):293 doi: https://doi.org/10.1136/bmj.38338.674583.AE
11. Parisius LM, Stock-Schröer B, Berger S, et al. Use of home remedies: a cross-sectional survey of patients in Germany. BMC Fam Pract. 2014;15(1):1–8. https://doi.org/10.1186/1471–2296–15–116.
12. Sisson E, Kuhn C. Pharmacist roles in the management of patients with type 2 diabetes. J Am Pharm Assoc. 2009;49(5):41–5.
13. Rosli MR, Wu DB, Neoh CF, et al. Economic evaluation of home medication review by community pharmacists (HMR-CP) for patients with type 2 diabetes mellitus (T2DM). J Med Econ. 2021;24(1):730–40.
14. Elina AN, Suraya MC, Ball PA. The impact of home medication review in patients with type 2 diabetes mellitus living in rural areas of Kuantan, Malaysia. Value Health. 2014;17(3):127.
15. Ahn J, Park JE, Anthony C, et al. Understanding, benefits and difficulties of home medicines review-patients' perspectives. Aust Fam Physician. 2015;44(4):249–53.
16. Zaman HH, Chai LL. Drug-related problems in type 2 diabetes mellitus patients with dyslipidemia. BMC Public Health. 2013;13(1):1192.

