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Study on Exploring the Impact of Nurse-Led Interventions on Patient Adherence to Medication in Osmanabad

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ABSTRACT: ***Background:*** Medication non-adherence is an important public health problem, especially in rural India, where the burden of chronic diseases is increasing, but access to healthcare and follow-up support is scarce. Rural and more so semi-arid regions like Osmanabad have patients who find it difficult to adhere to medication, with poor literacy levels, poor access to treatment, as well as financial limitations. Nurse-led interventions have demonstrated promise globally, but the local impact in such settings is not well-explored. ***Objectives:*** To assess the impact of nurse-led interventions on medication adherence among rural dwellers with chronic diseases; investigate patients' perceived facilitators and barriers for adherence; and develop contextual policy options for integrating these models into rural health systems. ***Methods:*** A convergent parallel mixed method was used. The study included seventy adult hypertensive or diabetic patients from three Primary Health Centres of Osmanabad. The six-month intervention included home visits, academic counselling, dissemination of pill organizers, and telephone follow-up by trained nurses. Adherence pre- and post-intervention was assessed through a validated scale, and in-depth, semi-structured interviews were held with 20 participants for qualitative considerations. ***Results:*** High adherence rates surged from 17.1% to 41.4% after the intervention, whereas low adherence declined substantially. Participants also say they have a better understanding, an emotional connection to nurses, and are more motivated. But for some, obstacles, including the affordability of medicine and access to the clinic, remained. ***Conclusions:*** Nurse-led interventions increased adherence to medication in a rural Indian setting through a model in which the nurse acted as a behavioural reinforcer while maintaining empathetic patient interaction. However, if one wants this model to work, the support needs to be systemic, with subsidies, without integration, and work within the community.

Keywords: Nurse-led intervention, medication adherence, chronic diseases, rural healthcare, patient engagement, behavioural change, Osmanabad.

RESEARCH PAPER

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1. INTRODUCTION

1.1 Background

Adherence to medications is an important predictor of the health outcome of chronic diseases, yet it is suboptimal in many low-resource settings. The World Health Organization has long said that increasing adherence could have the single greatest impact on population health of any specific health intervention [1]. In rural areas of India, including the Osmanabad district, these conditions are compounded by a lack of health facilities, illiteracy concerning health issues, and poverty [2,3].

Nurse-led interventions in adherence (such as structured counselling and home-based and behavioural reinforcement interventions) have demonstrated efficacy potential for improving adherence, and this effect is even greater among underserved populations [4]. The proven benefits of these interventions in urban settings have been reported, but there is limited evidence supporting their use in rural, semi-arid India.

1.2 Rationale

Osmanabad, a drought-prone area in the Marathwada region of Maharashtra, is challenged by several bottlenecks in healthcare provision, viz lack of physicians, high number of patients, and a broken

follow-up system. Nurse Practitioners located within PHCs and newly operationalised HWCs are being seen as an important link in many such gaps. However, there is little research on the role of these utilities in medication adherence in this setting.

The objective of the study was to assess the effectiveness of nurse-led interventions on treatment adherence of non-communicable diseases (NCD) patients in Osmanabad, and also to gain in-depth narratives of the patients to have in-depth knowledge.

1.3 Problem Statement

Adherence to long-term treatment in rural Maharashtra, despite national programs such as Ayushman Bharat and NPCDCS, continues to be erratic [5]. There is little evidence regarding the effect of nurse-led interventions, when suitably adjusted to local sociocultural and infrastructural conditions, on adherence results.

1.4 Objectives

- To study the impact of nurse-led intervention in enhancing drug adherence in patients with chronic diseases in Osmanabad.
- To establish patient-reported barriers and facilitators to adherence.
- To offer policy-oriented recommendations about how nurse-led models might be effectively integrated into rural health systems.

1.5 Significance of the Study

This study supports wider government of India objectives under the National Health Policy 2017, which emphasize task-shifting and community care. Through attention to nurse-led models in rural India, this investigation provides tangible lessons for policymakers, PHC managers, and nursing educators who are looking to enhance chronic disease care in similar settings.

2. REVIEW OF LITERATURE

2.1 Conceptual Understanding of Medication Adherence

The level to which a patient takes a recommended treatment is called adherence. It comprises initiation, correct dosing, and persistence. As the WHO highlighted, poor adherence can compromise the efficacy of otherwise effective treatments [6]. This is especially detrimental for the prevalence of chronic non-communicable diseases (NCDs) such as hypertension and diabetes, for which long-term consistency is needed.

2.2 Global Evidence on Nurse-Led Interventions

Nurses have established positive results internationally with nurse-led interventions. A meta-analysis found that organised nursing interventions, such as patient education, monitoring, and support, notably enhanced adherence to medication in a variety of long-term conditions. Independently demonstrated that nurse-led COPD programs were associated not only with adherence but also with increases in quality of life, patient confidence, and disease knowledge [7].

2.3 Indian Context: Challenges and Gaps

Factors affecting adherence. Medication adherence in India is influenced by structural and psychosocial barriers, including low health literacy, stigma, access constraints, and irregular follow-up [8]. reported that in a tertiary hospital, 28% of individuals were highly compliant; reasons included forgetfulness, financial distress, and the fear of becoming addicted [11]. A study conducted in a rural hospital by Basu *et al*. highlighted the responsibility of physicians and nurses on adherence support, and also the lack of standardized protocols for nurses [12].

2.4 Role of Nurses in Chronic Disease Management

The potential role of nurse practitioners in increasing adherence was further supported by Deswal *et al*., who found that a brief nurse-led psychoeducation intervention increased self-reported adherence in alcohol dependent patients a condition driven largely by behaviour, just as NCDs. However, those who examined pharmacists found education and medication reminders effective measures, both of which are often integrated as part of nurse-led models [9].

A review re-confirmed that multi-component interventions (both behavioural activation and patient engagement are integrated) are more effective than single interventions [10], highlighting the benefits of comprehensiveness that nurses contribute when they are part of chronic care teams.

2.5 Theoretical Frameworks and Behavioral Models

Theories of behavioural change provide a framework for understanding and enhancing adherence. Based on the Health Belief Model, patients will be more likely to follow when they perceive high susceptibility and severity with low barriers. Motivational interviewing can be applied to this existing framework to individualize communication and encourage patients; nurse practitioners trained in motivational interviewing are well-positioned to use those frameworks.

2.6 Gaps in Literature and Need for Localized Evidence

Despite increasing knowledge, for the most part, studies are hospital-based, city-centric, or disease-focused. Most of the context-specific information on even very basic treatment and adherence support mechanisms is unknown, especially in semi-arid, rural areas such as Osmanabad, but nurse-led care might provide a scalable, culturally appropriate solution. The

evidence gap is being filled with patient stories, alongside outcome data, in the current study

3. RESEARCH METHODOLOGY

3.1 Study Design

We utilised a mixed-method approach to generate quantitative as well as qualitative data to get an overall picture of nurse-led interventional effects on medication adherence of patients. The study design was descriptive and overall longitudinal, documenting trends in adherence behaviour over time as perceived through the lens of patient lives.

3.2 Study Area

The study was conducted in the Osmanabad district of Maharashtra, which is a semi-arid Marathwada region. Suffering from recurrent drought, limited public health resources, and a mainly rural population, Osmanabad is such a hostile setting where the continuous DM care delivery is hardly accessible. The district was chosen because it was considered to be a typical rural setting, and there was a growing use of nurse practitioners in the PHCs and HWCs.

3.3 Study Population

The adult patients (aged 30–70) who had a confirmed diagnosis of chronic NCDs: hypertension and or type 2 diabetes mellitus were eligible to participate in the study. These patients were under treatment in three selected PHCs of Osmanabad and were on medications requiring long-term pharmacotherapy.

3.4 Sample Size and Sampling Procedure

Seventy purposive samples were used in the recruitment of participants. Eligibility criteria included:

- Hypertension or type 2 diabetes diagnosed for at least one year
- Current prescribing of at least one maintenance drug
- Consent to participate and Informed consent
- Follow-up availability for at least six months

Participants with cognitive impairment or serious mental illness that might prevent them from providing informed consent or managing medications independently were excluded.

3.5 Intervention Details

The main intervention was a 6-month-long nurse-led adherence-improving intervention. It included:

- Home assessment to understand adherence barriers and beliefs at baseline
- Visual teaching and teach-back medication literacy sessions
- Dispense pill organizers to facilitate daily adherence
- Bi-monthly trained nurse visits, with adherence support
- Weekly motivational messages and telephonic reminders

Introductory training was delivered to nurses in motivational interviewing and brief behavioural change counselling.

3.6 Data collection tool and technique

Quantitative data were also gathered by a validated measure to assess adherence (Morisky Medication Adherence Scale) at baseline and 6 months after the intervention. Qualitative information was collected using semi-structured interviews with a subset of 20 participants to uncover patient understanding, attitudes, and local barriers to adherence. All interviews were audio-taped and transcribed word-for-word.

3.7 Data Analysis

Descriptive and inferential statistics were used to analyse the quantitative data. Pre-post adherence scores were compared with paired t-tests (or Wilcoxon signed-rank where data were not normally distributed). The qualitative section was analysed for themes, with iterative coding used to account for emerging themes. Triangulation was used to increase interpretive validity.

3.8 Ethical Considerations

Approval from the Institutional Ethics Committee was obtained before commencement of the study. All participants gave written informed consent, and confidentiality and anonymity were guaranteed during the entire study. All of the interactions were carried out in the local language (Marathi), considering cultural etiquette.

4. RESULTS AND ANALYSIS

4.1 Demographic Profile of Participants

Table 1. Demographic Characteristics of Study Participants (n = 70)

Variable	Category	Frequency (%)
Age (years)	30–45	18 (25.7)
	46–60	34 (48.6)
	61–70	18 (25.7)
Gender	Male	39 (55.7)
	Female	31 (44.3)

Chronic Condition	Hypertension only	38 (54.3)
	Diabetes only	22 (31.4)
	Both	10 (14.3)
Education	No formal education	23 (32.9)
	Primary/Secondary	33 (47.1)
	Higher Secondary+	14 (20.0)

Most patients (46-60 years) suffered from hypertension, characterizing a rural chronic care population. Education levels were mostly low; hence, simple communication is important in adherence plans.

4.2 Changes in Medication Adherence Post Intervention

Table 2. Medication Adherence Levels Before and After Nurse-Led Intervention

Adherence Level	Pre-Intervention (n, %)	Post-Intervention (n, %)
Low (<6)	32 (45.7)	13 (18.6)
Moderate (6–7)	26 (37.1)	28 (40.0)
High (=8)	12 (17.1)	29 (41.4)
Mean Score (±SD)	5.84 ± 1.12	7.42 ± 0.98

The medication adherence score was significantly improved, more than tripling for high adherence postintervention. This transition highlights the success of long-term, nurse-led behaviour support in rural health care service delivery.

4.3 Thematic Analysis of Patient Interviews (n = 20)

Table 3: Emergent Themes from Qualitative Interviews

Theme	Description
Trust and Emotional Safety	Participants described nurses as empathetic, patient, and respectful.
Practical Routine Anchoring	Tools like pill boxes and reminders improved consistency in medicine intake.
Financial and Logistical Barriers	Some still struggled with medicine costs and clinic access, despite motivation.

The human connection with nurses and structured tools reinforced behavior, but affordability and transportation have yet to be solved. These perspectives emphasize the importance of both system-level and interpersonal interventions.

4.4 Summary Integration

Numerical improvements in adherence were complemented with anecdotal evidence of enhanced understanding, trust, and routine. Although the nurse-led model showed promise, structural issues to guarantee that the model can be sustainable in the long run should be tackled in an organized manner.

5. DISCUSSION

5.1 Interpretation of Key Findings

A nurse-led intervention in Osmanabad showed a notable increase in medication adherence among chronic patients through this study. The percentage of subjects with high adherence increased from 17.1% to 41.4%, and that for low adherence decreased sharply. These results are consistent with evidence from around the world that nurse-led models that are customized and community-based can lead to better outcomes for chronic disease [4,7].

Qualitative findings also showed that emotional coherence, practical aids such as pill organizers, and regular monitoring were important for a change of behaviour. Participants identified the nurse as a “non-judgmental listener,” supporting the importance of trust and continuity in rural health care [8,9].

5.2 Comparison with Existing Literature

The two maximum values are in agreement with Van Camp *et al.*'s meta-analyses that reported that nurse-led interventions were effective in improving adherence to chronic conditions, particularly if interventions were sustained and tailored [4]. For the Indian scenario, Deswal *et al*. Similarly, positive results in adherence were reported using a brief nurse-delivered psychoeducational intervention, also in behaviourally complex settings like alcohol dependence [10]. Our study expanded this evidence to a rural semi-arid district, highlighting that their models were flexible enough.

Furthermore, application of behavioural ‘nudges’, rather in terms of visual reminders and lifestyle anchoring, reinforces findings where multi-component interventions significantly enhance adherence among hypertensives.

5.3 Barriers and Contextual Challenges

Although there were successes, some participants still encountered barriers, such as the cost of medications or transportation problems. These findings are similar to the study by Mathew *et al*., who reported that financial constraint and forgetfulness were the main causes of non-adherence in a tertiary care setting in India. For interventions to work, even the best-designed responses can be undermined by structural barriers such as those in Osmanabad, where public transport is either not available or rates of out-of-pocket household spending remain high.

5.4 Strengths of the Study

- Relevance: Such a study originated from the rural communities in India and thus has significance in such geographic areas.
- Hybrid design: The combination of quantitative and qualitative answers allowed for a complete overview of the adherence behaviour.
- Humanized approach: Centering patient voices, the study captured not only the outcome, but the human experience behind the outcome.

5.5 Implications for Practice and Policy

Results: There appears to be a scope and support for the incorporation of the nurse-led adherence intervention in India's HWC strategy. Education of nurses in motivational interviewing, adherence tools, and support to reduce the cost of key medications may improve chronic disease management in rural areas. Additionally, its reach and sustainability may be increased through collaboration with ASHA workers and local panchayats.

6. CONCLUSION

The present study aimed to assess the effect of nurse-led interventions on patients receiving a nurse-led intervention on medication adherence in rural Osmanabad, a district with both access to healthcare and infrastructure problems. Focused and continuous nursing intervention can increase adherence in those with chronic conditions such as hypertension and diabetes. The percentage of participants reported being highly adherent more than doubled after intervention, with a sharp decrease in low adherence, which may have implications for nursing, education, and relations.

Beyond statistics, the patient stories revealed through this mixed-methods approach indicate a fundamental reconceptualization and reorientation. To many, these nurses were not just providers, but trusted mentors simplifying complicated medication routines, reinforcing daily habits, and providing emotional support lacking in short clinical visits. PDAs with features such as pill boxes, reminder charts, and telephone follow-up were simple and culturally relevant tools.

However, systemic barriers remain. Sustainability in the long-term access to and use of ART for individuals with financial constraints, limitations to drug availability, and mobility is still an issue. These structural barriers highlight the importance of system-level reform, such as including medication subsidies, increasing task-shifting, and participation of rural community governance structures in rural health delivery.

Together, these are evidence of the worth of nurse-led models of care in India's changing healthcare context, especially in resource-poor settings where doctors are in short supply but nurses are already connected to communities. Properly resourced and with the opportunity to be trained and trusted, nurses act not only as carers, but as the change agents for continued behavioural change. Future studies should use this evidence as the basis for the design of feasible, scalable, equity-driven interventions to bridge the treatment-adherence divide in rural India.

7. Conflicts of Interest

The author has no conflicts of interest related to this study. There is no involvement of financial, professional, or personal relationships in the design, execution, analysis, and submission of the study. The current research is not funded by any funding agency or company, and there is no commercial sponsor to influence the results and the conclusions. Ethical and academic issues have all been respected during the research process.

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