Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 6 (2024): June 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i6.1169
Original Article

EVALUATING MEDICATION ADHERENCE THROUGH HOME MEDICATION REVIEWS IN THE PAEDIATRIC COMMUNITY: A CROSS-SECTIONAL STUDY.

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ABSTRACT.

Background:
Medication adherence is vital for managing chronic conditions in pediatric populations, with community pharmacist-led home medication reviews showing promise in improving adherence and outcomes. However, they require careful consideration of pediatric-specific challenges and needs. The study aimed to evaluate medication adherence through home medication reviews in the pediatric community.

Methods:
A cross-sectional study was conducted over one year. One hundred participants aged 18 years and below, undergoing medication for any illness, were included. Data on socio-demographic characteristics, presenting symptoms, medical histories, diagnoses, treatments, and outcomes were collected using a custom-designed instrument. Statistical analysis was performed using Microsoft Excel 2019.

Results:
The study of 100 pediatric participants (52% males, 65% aged 16-18) found an 80% symptom improvement post-treatment and an 85% overall medication adherence rate. Home medication reviews increased adherence by 15%, with higher rates in chronic conditions like asthma (90%) compared to acute conditions (80%). Participants and caregivers reported improved medication understanding and reduced errors, with rural participants showing notable adherence improvements (70% to 85%).

Conclusion:
Home medication reviews significantly improved medication adherence in pediatric patients, increasing overall adherence rates by 15%. The intervention was particularly effective for chronic conditions like asthma. Participants showed symptom improvement, and both patients and caregivers responded positively. These findings highlight the value of pharmacist-led home medication reviews in enhancing adherence and health outcomes in pediatric care.

Recommendations:
Advocate for integrating community pharmacist-led home medication reviews into pediatric care, tailor interventions for socio-demographic factors, foster collaboration among healthcare providers, and conduct further research on their long-term effectiveness and cost-effectiveness.

Keywords: *Medication Adherence, Paediatric Care, Community Pharmacist, Home Medication Reviews.*
Submitted: May 7, 2024 Accepted: May 8, 2024

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INTRODUCTION.

Evaluating medication adherence, especially in pediatric populations, through home medication reviews presents a novel and impactful approach to improving health outcomes. The essence of such evaluations lies in understanding the multifaceted barriers to adherence and leveraging community resources, such as pharmacists, to tailor interventions that address these challenges directly.
Medication adherence is critically important in managing chronic conditions, such as sickle cell disease, in pediatric patients. Adherence rates in this demographic have been observed to be suboptimal, with various interventions highlighting the need for comprehensive strategies to improve them [1]. Community pharmacist-led medication reviews have demonstrated significant impacts on improving medication adherence among patients on polypharmacy, suggesting a promising avenue for pediatric care as well. These interventions not only enhance medication adherence but also lead to improvements in clinical outcomes, indicating a direct benefit to patient health [2].
Pediatric asthma management further exemplifies the importance of addressing adherence through multifaceted

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interventions. Studies have shown that medication adherence is influenced across multiple systems, emphasizing the need for research that spans individual, family, community, and healthcare domains to fully understand and tackle adherence issues [3].

The COVID-19 pandemic has underscored the feasibility and benefits of home delivery of medication by community health workers as a means to improve medication adherence. This model has shown promise in chronic disease management, suggesting that similar strategies could be beneficial in pediatric populations for ensuring consistent medication use.

Additionally, studies on pediatric transplant recipients reveal the complex interplay between patient and family factors in medication adherence, highlighting the importance of targeted interventions that address these dynamics to improve outcomes [4].

The emergence of mobile health apps targeting medication adherence presents a new frontier in this endeavor. These apps, equipped with features like medication alerts, tracking, and refill reminders, offer a modern, user-friendly approach to improving adherence, particularly among younger populations more accustomed to digital technologies [5].

Furthermore, home medication reviews for patients with conditions like type 2 diabetes mellitus by community pharmacists have demonstrated significant improvements in glycemic control, quality of life, medication adherence, and knowledge among patients, alongside a reduction in drug-related problems and medication wastage. This evidence supports the potential of home medication reviews in pediatric care as a means to enhance adherence and overall health outcomes.

The study aims to evaluate medication adherence among pediatric patients through home medication reviews conducted within the community setting.

METHODOLOGY.

Study Design.

A community-based cross-sectional study.

Study Setting.

The study took place at Katihar Medical College (KMC) for one year from May 2022 to August 2023.

Participants.

The study comprised a sample size of 100 participants.

Inclusion Criteria.

Inclusion criteria encompassed individuals aged 18 years and below who were currently undergoing medication for any illness, regardless of whether it was current or chronic.

Exclusion Criteria.

Exclusion criteria involved individuals aged above 18 years and those who were homeless or lacked stable accommodation.

Sample size.

To calculate the sample size for this study, the following formula was used for estimating a proportion of a population:

$$n = \frac{Z^2 \times p \times (1-p)}{E^2}$$

Where:
- n = sample size
- Z = Z-score corresponding to the desired level of confidence
- p = estimated proportion in the population
- E = margin of error

Bias.

Measures were implemented to mitigate bias through meticulous participant selection and adherence to standardized data collection protocols.

Variables.

The variables under consideration included demographic characteristics, presenting symptoms, medical and medication histories, diagnoses, treatment specifics (such as dosage, frequency, formulation, and duration), and patient progress.

Data Collection.

A custom-designed data collection instrument was utilized to gather pertinent information from eligible participants. This included demographic details, presenting symptoms, medical and medication histories, diagnoses, treatment specifics (dosage, frequency, formulation, duration), and patient progress. Medication adherence was measured using patient/caregiver self-reports, where participants or their caregivers reported their medication-taking behavior through structured interviews and questionnaires. Confidentiality of collected data was strictly upheld.

Study Method.

Data acquisition from eligible participants was facilitated through the utilization of a specially tailored data collection instrument. This method involved gathering comprehensive information, including demographic details, presenting symptoms, medical and medication histories, diagnoses, treatment specifics (such as dosage, frequency, formulation, and duration), and patient progress, while ensuring utmost confidentiality.

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Statistical Analysis.

Data analysis was conducted using Microsoft Excel 2019. The application of filters enabled the segregation of distinct subgroups within the study cohort, facilitating detailed examination and scrutiny.

Ethical considerations.

The Katihar Medical College Ethics Committee approved the study protocol, and all participants received written informed consent.

RESULTS.

Among the 100 participants included in the study, 52% were male and 48% were female. The mean age of the participants was 15 years, with a standard deviation of 2.3 years. The majority of participants belonged to the age group of 16-18 years (65%), followed by 13-15 years (30%) and under 13 years (5%).

Table 1: Socio-demographic profile of study participants.

Socio-Demographic Characteristic	Frequency (%)
Gender:	
- Male	52
- Female	48
Age Group:	
- Under 13 years	5
- 13-15 years	30
- 16-18 years	65
Residence:	
- Urban	40
- Rural	60
Education Level:	
- Primary School	25
- Secondary School	50
- Higher Secondary/College	25
Socioeconomic Status:	
- Low	40
- Middle	40
- High	20
Employment Status of Guardians:	
- Employed	60
- Unemployed	40

Approximately 60% of participants had a history of chronic illnesses, with the most prevalent being asthma (20%), followed by diabetes (15%), and epilepsy (10%). Among those with chronic illnesses, 70% reported being on medication at the time of the study.

The adherence rate was 85% overall, with higher adherence in participants with chronic conditions like asthma (90%) compared to acute conditions (80%). The home medication review intervention increased adherence by 15% from baseline.

Table 2: Acute and Chronic conditions in the study population.

Condition	Acute Cases (%)	Chronic Cases (%)	Adherence Rate (%)
Upper Respiratory Tract Infections (URTI)	35	15	80
Asthma	10	20	90
Diabetes	0	15	85
Epilepsy	0	10	85
Gastroenteritis	10	0	75
Urinary Tract Infections (UTI)	5	0	80
Other	10	10	80

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The most commonly reported presenting symptoms among the participants were fever (45%), cough (30%), and headache (25%). Other less frequently reported symptoms included fatigue (15%), body aches (10%), and gastrointestinal symptoms such as nausea and diarrhea (8%).

The most common diagnoses made during the study period were upper respiratory tract infections (URTI) (35%), followed by asthma exacerbations (20%) and viral fevers (15%). Other less frequent diagnoses included gastroenteritis (10%) and UTI (5%).

Table 3: Diseases that have been observed in the participants.

Disease	Frequency
Abdominal Pain	10
Anaemia	5
Asthma	20
Cold	15
Cough	30
Chickenpox	2
Dengue Fever	3
URTI	35
Down's Syndrome	1
Diarrhea	12
Eczema	8
Fever	45
Gastritis	7
Malaria	4
Measles	6
Nephrotic Syndrome	2
Pneumonia	18
Rashes	9
Seizures	3
Thalassemia	1
Throat Infection	10
Urinary Tract Infection (UTI)	5
Vomiting	15
Wheezing	25

The majority of participants diagnosed with URTI were prescribed antibiotics (75%), with amoxicillin being the most commonly prescribed antibiotic (60%). Participants with asthma exacerbations were predominantly treated with bronchodilators (80%), while those with viral fevers were managed symptomatically with antipyretics (90%).
Overall, 80% of participants showed improvement in their symptoms following treatment, with the remaining 20% requiring further medical intervention or hospitalization due to worsening symptoms or complications. Participants and caregivers reported high satisfaction with the intervention, noting improved understanding of medication regimens and reduced medication errors.
Addressing socio-demographic factors was critical, as rural participants showed a significant improvement in adherence rates post-intervention, increasing from 70% to 85%.

Significant associations were seen between age and presenting symptoms, with older participants more likely to present with cough and fever compared to younger. Additionally, a significant correlation was found between chronic illness and medication history, highlighting the importance of ongoing treatment and management in this population.

DISCUSSION.

The primary objective of this study was to evaluate medication adherence in pediatric patients through home medication reviews conducted by community pharmacists. The results demonstrate a significant improvement in medication adherence rates, increasing overall adherence by 15% compared to baseline. This

improvement highlights the effectiveness of pharmacist-led interventions in pediatric populations.

The adherence rate was notably higher in participants with chronic conditions, such as asthma, where adherence reached 90%, compared to 80% in those with acute conditions. This suggests that home medication reviews may be particularly beneficial for managing chronic diseases in children, ensuring consistent medication use and better health outcomes.

Symptom improvement was observed in 80% of the participants, indicating that increased adherence was associated with better clinical outcomes. Participants and caregivers reported high satisfaction with the intervention, citing improved understanding of medication regimens and reduced medication errors as significant benefits. This feedback underscores the importance of clear communication and education in promoting adherence.

Socio-demographic factors played a crucial role in adherence rates. Rural participants showed a substantial improvement in adherence following the intervention, increasing from 70% to 85%. This finding suggests that tailored interventions that consider socio-demographic characteristics can enhance adherence and health outcomes in diverse populations.

These results align with previous studies that have demonstrated the positive impact of pharmacist-led medication reviews on adherence and clinical outcomes. The assessment of drug compliance through home medication review (HMR) in the pediatric population has garnered attention in recent years, with several studies highlighting its significance and challenges. A community-based study focused on the storage of medicines at home revealed that a significant portion of households did not store medicines securely, indicating a lack of awareness regarding proper storage and the importance of checking expiry dates. This study underscores the need for educational interventions to improve medication safety practices in homes [6].

Another review emphasized the prevalence of self-medication practices among the pediatric population, with more than half of the study participants engaging in self-medication. This behavior increases the risk of medication errors, pointing to an urgent need for strategies to enhance pediatric medication safety [7]. Although not directly focused on the pediatric population, a study assessing the efficacy of HMR in geriatric hypertensive patients demonstrated the effectiveness of this approach in resolving drug-related problems (DRPs), suggesting that similar benefits could be observed in younger populations [8].

Clinical pharmacist-led medication reviews in pediatric inpatients have shown potential in detecting DRPs, highlighting the importance of involving pharmacists in direct patient care to improve medication safety [9]. Furthermore, an impact analysis of pharmacist-led HMR within an interprofessional outreach team for frail and homebound older adults identified a high number of medications and significant DRPs, indicating that HMRs could be an effective method to optimize medication therapy in the pediatric population as well [10].

A randomized controlled trial evaluating HMR for patients with Type 2 Diabetes Mellitus conducted by community pharmacists resulted in improved glycemic control, quality of life, medication adherence, and knowledge, along with reduced DRPs and medication wastage costs. These findings suggest that HMR could offer similar benefits for managing chronic conditions in children [11].

A systematic review of pediatric medication errors by parents or caregivers at home concluded that providing dosing tools matched to prescribed doses, recommending syringes for measurement, and educational interventions could significantly reduce medication errors. This emphasizes the critical role of caregiver education in enhancing medication safety for children [12].

CONCLUSION.

The study highlights the importance of home medication reviews in improving medication adherence in pediatric patients. The intervention not only increased adherence rates but also resulted in better symptom management and high satisfaction among participants and caregivers. Future research should explore the long-term effectiveness and cost-effectiveness of such interventions to further validate these findings and support their broader implementation in pediatric care.

LIMITATIONS.

It is important to acknowledge certain limitations of the study, including the relatively small sample size and the potential for selection bias due to the recruitment of participants from a single medical college setting. Additionally, the study's reliance on self-reported symptoms and medical histories may introduce recall bias and impact the accuracy of the findings.

RECOMMENDATION.

Encourage collaboration between healthcare providers, chemists, and stakeholders; design interventions to address sociodemographic factors; and carry out additional research on the long-term and cost-effectiveness of such interventions. Promote the integration of community pharmacist-led home medication reviews into pediatric care practices.

ACKNOWLEDGEMENT.

We are thankful to the patients; without them, the study could not have been done. We are thankful to the supporting staff of our hospital who were involved in the patient care of the study group.

LIST OF ABBREVIATIONS.

URTI: upper respiratory tract infections
UTI: urinary tract infection
HRM: home medication review
DRP: drug-related problems

SOURCE OF FUNDING.

No funding was received.

CONFLICT OF INTEREST.

The authors have no competing interests to declare.

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https://doi.org/10.51168/sjhrafrica.v5i6.1169
Original Article

Publisher details.

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Category: Non-Government & Non-profit Organisation
Contact: +256775434261(WhatsApp)
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Website: https://sjpublisher.org
Location: Wisdom Centre Annex, P.O. BOX. 113407 Wakiso, Uganda, East Africa.