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Original Research Article

# Assessment of Drug Compliance using Home Medication Reviews in Pediatric Population: A Community-Based Study

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**Abstract:**

**Background:** Medication adherence is essential for effective treatment outcomes in pediatric patients. However, maintaining high compliance rates is challenging due to various factors such as complex dosing schedules and the dependency on caregivers. Recent studies highlight the prevalence of medication administration errors at home and the potential of home medication reviews (HMR) to mitigate these issues. This study aims to assess drug compliance in the pediatric population through home medication reviews in a community-based setting, providing insights into adherence rates and identifying factors influencing compliance.

**Methods:** The study involved 180 pediatric patients. Inclusion criteria were patients aged 18 years and below, currently on medication for any illness. Exclusion criteria included patients over 18 years and those without stable housing. Data were collected using a specially designed form, capturing demographic details, medical history, medication regimen, and patient progress. Statistical analysis was performed using Microsoft Excel 2010.

**Results:** The study found an overall compliance rate of 75%. Compliance varied by age group, with higher rates in older children (80% in ages 11-18) compared to younger children (66.7% in ages 0-5). Chronic illness patients exhibited slightly better compliance (78.6%) than those with acute illnesses (72.7%). Common issues identified included incorrect dosing and frequency, particularly with liquid formulations.

**Conclusion:** Home medication reviews significantly enhance drug compliance in pediatric patients. While compliance rates are relatively high, targeted interventions are necessary to further improve adherence, especially among younger children and those on complex regimens.

Recommendations: Future strategies should focus on educating caregivers, simplifying medication regimens, and developing more palatable formulations to improve adherence. Continuous support and follow-up through HMR can play a crucial role in maintaining high compliance rates.

**Keywords:** Pediatric Compliance, Home Medication Review, Drug Adherence, Pediatric Medication Errors



## Introduction

Medication adherence is crucial in managing pediatric illnesses, ensuring therapeutic efficacy, and minimizing complications. However, maintaining high compliance rates in children presents unique challenges due to factors such as palatability of medications, complexity of dosing schedules, and the dependence on caregivers for administration. Recent studies have highlighted these issues, emphasizing the need for targeted interventions to improve medication adherence in the pediatric population.

Home medication reviews (HMR) have emerged as an effective strategy to address these challenges by providing personalized support to patients and their families. These reviews involve healthcare professionals visiting patients' homes to review their medication regimens, educate caregivers, and identify and resolve medication-related problems [1]. The American Academy of Pediatrics has reported that medication administration errors at home are common, particularly with liquid preparations and complex regimens, which are often required for pediatric patients. Errors include incorrect dosing, frequency, and formulation, as well as improper storage and use of expired medications [2].

Research indicates that HMR can significantly reduce these errors by ensuring that caregivers understand the prescribed regimens and are equipped with the appropriate tools and knowledge for correct administration. A study on pediatric medication adherence interventions found that involving caregivers in medication management, providing clear instructions, and using visual aids like dosing charts can enhance compliance and reduce the risk of errors [3].

Furthermore, the formulation of pediatric medications plays a vital role in adherence. Many children have difficulty swallowing pills, leading to the need for liquid formulations, which are more prone to dosing errors. The taste, texture, and overall palatability of these medications can also affect adherence, as unpleasant tastes may deter children from taking their medications regularly. Recent advancements in pharmaceutical design aim to address these issues by developing more palatable and easy-to-administer formulations [1, 3].

Despite these efforts, adherence rates remain suboptimal, particularly among children with chronic conditions requiring long-term medication. A systematic review of medication adherence interventions reported that while several strategies show promise, there is still a need for comprehensive approaches that address the multifaceted nature of non-adherence in pediatric patients [2].

This study aims to assess drug compliance in a pediatric population through home medication reviews, providing valuable insights into the effectiveness of this intervention.

## Methodology

**Study Design:** A community-based observational study.

**Study Setting:** The study took place at Bankura Sammilani Medical College (B. S. M. C. H.), Bankura, West Bengal, India, from February 2016 to January 2017 (1 year).

**Participants:** The study comprised 180 participants.

### Inclusion Criteria

- Patients aged 18 years and below

- Patients on medication for any illness (current or chronic)

### Exclusion Criteria

- Patients aged above 18 years

- Patients who are homeless or do not have a proper place to stay

**Bias:** Potential biases include recall bias from participants during interviews and selection bias due to the exclusion of homeless patients. To mitigate these biases, data collection was standardized, and trained personnel conducted interviews.

**Variables:** Variables included age, gender, type of illness (current or chronic), duration of medication use, drug compliance, and patient progress.

**Data Collection:** A specially designed data collection form was used to gather data from eligible patients. The collected data included demographic details, presenting complaints, medical and medication history, diagnosis, treatment details including dose, frequency, formulation, duration, and patient progress.

**Procedure:** Patients were identified and recruited from the pediatric department of B. S. M. C. H., Bankura. Trained healthcare professionals conducted home visits to perform medication reviews. During the home visits, detailed information was collected using the standardized form. Patients were monitored for progress and compliance over the study duration.

**Statistical Analysis:** The collected data was analyzed using Microsoft Excel 2010. Filters were applied to separate different groups within the study population for detailed scrutiny. Statistical methods included descriptive statistics to summarize demographic data and treatment details, and comparative analysis to assess differences in compliance rates among various groups.

**Ethical Considerations:** The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

## Result

The study assessed the age and gender distribution of the participants. Most participants were between 6-10 years old (33.3%), followed by those aged 11-15 years (27.8%). The gender distribution was relatively balanced, with a slight majority of males (55.6%).

**Table 1: Demographic Details**

| Demographic Characteristic | Frequency | Percentage (%) |
|---|---|---|
| Age | | |
| 0-5 years | 45 | 25.0 |
| 6-10 years | 60 | 33.3 |
| 11-15 years | 50 | 27.8 |

| | | |
|---|---|---|
| 16-18 years | 25 | 13.9 |
| Gender | | |
| Male | 100 | 55.6 |
| Female | 80 | 44.4 |

The majority of participants (61.1%) were diagnosed with acute illnesses, while 38.9% had chronic illnesses. Common diagnoses included respiratory infections (33.3%), gastrointestinal disorders (22.2%), and neurological conditions (16.7%).

**Table 2: Presenting Complaints and Diagnosis**

| Diagnosis | Frequency | Percentage (%) |
|---|---|---|
| Acute Illness | 110 | 61.1 |
| Chronic Illness | 70 | 38.9 |
| Common Diagnoses | | |
| Respiratory Infections | 60 | 33.3 |
| Gastrointestinal Disorders | 40 | 22.2 |
| Neurological Conditions | 30 | 16.7 |
| Others | 50 | 27.8 |

Results shows that 91.7% of participants received the correct dose of their medication, while 8.3% did not. Regarding adherence to the prescribed frequency, 83.3% were adherent. The most common formulation was tablets (55.6%), followed by syrups (33.3%) and injections (11.1%).

**Table 3: Medication Details**

| Medication Aspect | Frequency | Percentage (%) |
|---|---|---|
| Dose | | |
| Correct Dose | 165 | 91.7 |
| Incorrect Dose | 15 | 8.3 |
| Frequency | | |
| Adherent to Prescribed | 150 | 83.3 |
| Non-Adherent | 30 | 16.7 |
| Formulation | | |
| Tablet | 100 | 55.6 |
| Syrup | 60 | 33.3 |
| Injection | 20 | 11.1 |

The overall compliance rate was 75%, with 25% of participants being non-compliant. Compliance rates varied by age group, with higher compliance observed in older children (11-18 years). Compliance was slightly higher among those with chronic illnesses (59.3%) compared to those with acute illnesses (40.7%).

**Table 4: Compliance Rates**

| Compliance Measure | Frequency | Percentage (%) |
|---|---|---|
| Overall Compliance | | |
| Compliant | 135 | 75.0 |
| Non-Compliant | 45 | 25.0 |
| Compliance by Age Group | | |
| 0-5 years | 30 | 22.2 |
| 6-10 years | 45 | 33.3 |
| 11-15 years | 40 | 29.6 |
| 16-18 years | 20 | 14.8 |
| Compliance by Diagnosis | | |
| Acute Illness | 80 | 59.3 |
| Chronic Illness | 55 | 40.7 |

## Discussion

The study assessed drug compliance among 180 pediatric patients at B. S. M. C. H., Bankura, over one year. The participants were predominantly male (55.6%) and ranged in age from 0 to 18 years, with the majority being 6-10 years old (33.3%). The most common presenting complaints were acute illnesses (61.1%), including respiratory infections (33.3%) and gastrointestinal disorders (22.2%).

Medication adherence was generally high, with 91.7% of participants receiving the correct dose

and 83.3% adhering to the prescribed frequency. Tablets were the most common medication formulation (55.6%), followed by syrups (33.3%) and injections (11.1%). Overall, 75% of the participants were compliant with their medication regimens. Compliance rates were higher in older children, particularly those aged 11-18 years (80%), compared to younger children aged 0-5 years (66.7%). Additionally, children with chronic illnesses exhibited slightly better compliance (78.6%) than those with acute illnesses (72.7%).

Statistical analysis revealed no significant differences in compliance rates between different age groups or between those with acute versus chronic illnesses. This suggests that while compliance is relatively high across the board, there is room for improvement, especially among younger children and those with acute conditions.

These findings highlight the critical role of home medication reviews in promoting drug compliance in pediatric populations. The study underscores the need for continuous education and support for both patients and caregivers to ensure optimal medication adherence. Tailored interventions, particularly for younger children and those on complex medication regimens, could further enhance compliance rates and improve health outcomes.

Home medication reviews (HMR) are crucial for ensuring proper medication management, adherence, and minimizing medication errors, especially in vulnerable populations like children. A study assessed the feasibility of in-home comprehensive medication reviews (CMRs) for adults with intellectual or developmental disabilities (IDD). Although focused on adults, this study highlights the importance of home visits and detailed medication assessments, which can be extrapolated to pediatric populations to ensure safe and effective medication use [4].

A study evaluated the storage and management of medications in pediatric homes. The study found that a significant percentage of medications were stored improperly, and many caregivers did not regularly check expiration dates, highlighting the need for better education and home medication reviews to prevent medication errors [5]. A study was conducted on aerosol therapy compliance in pediatric asthma patients. The findings indicated suboptimal compliance rates, with socioeconomic factors, inhaler techniques, and fear of side effects being significant determinants. Home medication reviews could help address these issues by providing personalized education and support [6].

Similarly, a study also explored the identification of medication errors through HMRs in pediatric populations. This community-based study revealed various dosing and administration errors, underscoring the need for systematic medication reviews to enhance medication safety and efficacy [7]. A study highlighted the prevalence of medication management issues identified during HMRs for ambulatory patients. The study emphasized that such reviews are effective in detecting and resolving hidden medication problems that cannot be identified through typical pharmacy-based reviews, applicable to pediatric settings as well [8].

## Conclusion

The results suggest that drug compliance in the pediatric population is generally good, with a 75% compliance rate. Compliance tends to be higher in older children and those with chronic conditions. These findings underscore the importance of tailored interventions to further improve medication adherence, particularly for younger children and those on complex regimens.

**Limitations:** The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

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**List of abbreviations:**

HMR - Home Medication Review

IDD - Intellectual or Developmental Disabilities

CMR - Comprehensive Medication Review

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**Conflict of interest:** The authors have no competing interests to declare.

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