

Medication Adherence and Polypharmacy Analysis in the 45+ Age Group: A Tertiary Care Hospital Study

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Abstract:

Polypharmacy refers to consumption of many drugs to treat various illnesses, is common amongst elderly people suffering multiple medical conditions. Although this can seem as being the natural way of action, it brings with it a unique array of challenges. Taking several drugs might have negative consequences such as an increased chance of death, falls, and bad drug responses. Polypharmacy is a significant and growing issue in modern clinical settings, attracting consciousness among clinicians, prescription makers, and policymakers worldwide. The Morisky Medication Adherence Scale (MMAS) is a common measure for monitoring medication adherence via questionnaires. We performed prospective observational research to evaluate adherence to drugs and taking multiple prescriptions analysis in individuals aged 45 and older. This study obtained data from 200 patients using an adequate sampling strategy. The research project focusses on the significant problem of nonadherence to medication amongst people ageing 45 and up within a hospital with tertiary care environment. The statistics show that a large number (35.5%) of the patients had poor drug compliance, that may cause a negative impact on therapy results and general health. Ultimately, the present research emphasises the need for comprehensive interventions to increase medication adherence, particularly among the elderly. Education for patients, drug regimen reduction in complexity, better drug administration methods, along with enhanced interaction amongst medical professionals and their patients are all possible strategies.

Keywords: Polypharmacy, Drug compliance, Multiple medications, Morisky Medication Adherence Scale (MMAS).

1. Introduction:

1.1. Polypharmacy: Polypharmacy, which means a combination of multiple long-term medication usage, is extremely frequent amongst the elderly [1]. It involves addressing numerous medical issues at the same time, which may be stressful both for the patients and medical professionals. It is not only about having several illnesses; it also affects many elements of an individual's existence, including their quality of life, self-perceived state of wellness, as well as regular life capabilities. Unfortunately, it typically leads to further visits to the hospital, increased suffering, and greater expenses for healthcare. Since worldwide demographic expands and increasing numbers of

people struggle with several health issues, the financial cost of multiple medical conditions is expected to rise.

The expanding application numerous drugs, known as polypharmacy, represents an enormous challenge for the medical field. Polypharmacy has hazards, but it may also provide benefits individuals as medications serve to control, slow down as well as ease signs of disorders [2]. Polypharmacy is a significant along with growing issue in modern clinical care, attracting focus across medical professionals, recommended practices, professionals, and legislative bodies alike [3,4]. In our study, we explored the magnitude of this issue in those over the age of 45 particularly an entire group viewing it by means of an epidemiological lens, based on observations gleaned via a comprehensive assessment of current literature [5,6]. Ageing, the existence of numerous long-term disorders, and broad adoption of evidence-based treatment guidelines are all connected with increased polypharmacy [7,8].

1.2. Causes of Polypharmacy: Polypharmacy is caused by a population that is growing older, which is typically fragile, as well as an increase in having multiple conditions [9,10]. Existing research studies and recommendations frequently disregard polypharmacy in instances of numerous long-term illnesses [11,12]. Hospitals should adopt a more comprehensive strategy that takes into account these difficult instances [13,14].

2. Objectives:

- Assess the medication adherence levels among the individuals aged 45 years and above.
- Examine prescription patterns, focusing on type of medications prescribed.
- Investigate the factors influencing medication adherence.
- Propose evidence-based recommendation for optimizing medication management

3. Methodology:

Prospective observational research took place at a tertiary care organisation. This study examined polypharmacy trends and drug adherence in patients aged 45 and older. Subject as well as Selection: The research targeted people aged 45 and up with chronic conditions which needed multiple medications. The purposeful sample strategy was utilised to choose 200 eligible patients who met the inclusion criteria.

3.1. Inclusion Criteria:

- Patients aged ≥ 45 years.
- Active prescriptions for chronic or long-term conditions.
- Willingness to participate in the study.

3.2. Exclusion Criteria:

- Age < 45 years.
- Severe cognitive impairments.
- Patients unwilling to participate.

3.3. Tools for used Acquiring Data: The Morisky Medication Adherence Scale (MMAS-8) To assess self-reported medication adherence, a standardised questionnaire known as the MMAS-8 was developed [15]. It consists of eight concerns that cover a range of compliance behaviours, including deliberate cessation, forgetfulness, and dosage skipping. Binary (yes/no) or ordinal (always, sometimes) answers are available for each question [16,17]. Higher scores (ranging from 0 to 8) indicate better adherence.

3.3.1. Adherence levels are classified into the following categories:

- High adherence with an MMAS-8 level at score of 8.
- MMAS-8 scores of 6 or lower to 8 reflect moderate compliance.
- Low adherence: <6 on the MMAS-8.

To make sure participants understood every question, the MMAS-8 was given during organised interviews. The scale is a useful tool for determining adherence patterns and guiding focused treatments because of its simplicity and dependability.

3.4. Demographic Variables: To put adherence patterns in context, information on age, gender, and occupation has been collected.

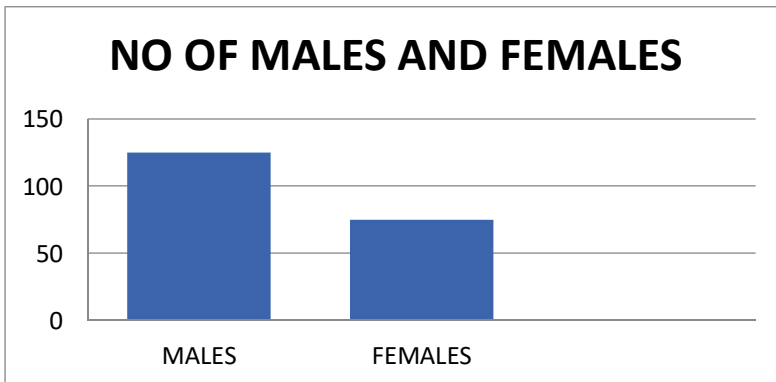
3.5. Clinical Variables: Medical records and patient interviews were used to gather data on comorbidities, prescription drugs, and treatment plans. This covered the length of time taken as well as any possible obstacles to adherence.

3.6. Ethical Factors: The institutional ethics committee approved the project. All participants provided written consent that was informed, assuring their voluntary involvement and privacy.

3.7. Data Analysis: To assess categorical variables and investigate correlations between adherence and other characteristics, statistical procedures including correlation analyses and chi-square tests were used to examine quantitative data. Clinical and demographic data were summarised using descriptive statistics.

4. Results:

4.1. Demographics: Of the 200 subjects, from Graph 1 shows 125 were men (62.5%) and 75 were women (37.5%). The most prevalent age group was 55–65 years old (40%), subsequently followed by 65–75 years old (24%), 45–55 years old (23%), and 75–85 years old (13%).



Graph 1: Gender wise distribution of observation

4.2. Multiple medical conditions: The two most prevalent conditions were diabetes mellitus and hypertension. With 34% of patients having two comorbidities and 28.5% having three, the prevalence of multimorbidity was significant from Table 1.

Table 1: Associated comorbidities

No. of Co-morbidities	No.of patients	Percentage	Chi-square test value
1	39	19.5%	0.001
2	68	34%	
3	57	28.5%	
4	27	13.5%	
5	09	4.5%	

4.3. Departmental Distribution: Pulmonology (9%), neurology (10.5%), and cardiology (44.5%) had the largest patient loads.

4.4. Trends in Polypharmacy: Thirty percent of patients received five prescriptions. Less frequently, prescriptions containing more than eight medications were written (21%).

4.5. Medication Adherence: Medication adherence was classified as poor (35.5%), average (20%), and good (44.5%) based on MMAS-8 scores. Late intake (64%), missing doses (55%), and stopping medicine (35%), were factors that led to non-adherence from Table 2.

Table 2: Level of medication adherence

Adherence Level	Patients (n)	Percentage (%)
Poor	71	35.5%
Average	40	20%
Good	89	44.5%

Table 3: Correlation coefficient of observations

S.No	Variable 1	Variable 2	Correlation value
1	Gender	MMAS-8 Score	1
2	Age	MMAS-8 Score	-0.8
3	No. of comorbidities	MMAS-8 Score	0.7
4	Diagnosis	MMAS-8 Score	-0.4

5. Discussion:

According to this study, a considerable percentage of individuals 45 years of age and older have poor drug adherence, and polypharmacy is quite prevalent among them. Intentional discontinuance, late intake, and dosage skipping were the main causes of non-adherence. The intricacy of managing multimorbidity and polypharmacy in older persons is highlighted by these findings, which are consistent with previous research.

5.1. Gender-wise Distribution: The first image provides a breakdown of the patient population by gender. It reveals that out of the total number of patients, 125 (62.5%) were male, while 75 (37.5%) were female. The bar chart visually represents this gender distribution, clearly showing a higher proportion of male patients compared to female patients.

5.2. Age-wise Distribution: The second image presents the age-wise distribution of patients. It categorizes the patients into four age groups: 45-55, 55-65, 65-75, and 75-85. The data shows that the largest age group is 55-65 years, comprising 40% of the patients, followed by the 45-55 age group with 23%, the 65-75 age group with 24%, and the 75-85 age group with 13%. The bar chart effectively illustrates this age distribution, with the 55-65 age group having the highest bar.

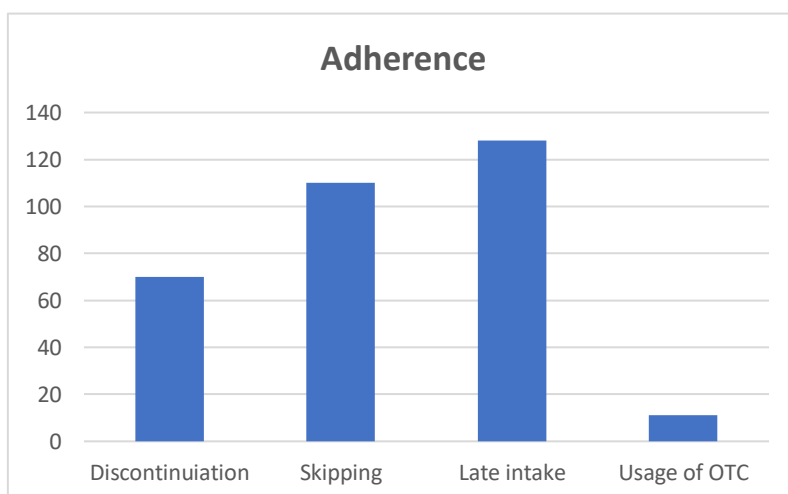
5.3. Associated morbidities: The data table presents the number of patients with 1, 2, 3, 4, or 5 co-morbidities, along with their respective percentages and Chi-square test results. The bar chart visually depicts the number of patients with each number of co-morbidities. It is evident that a significant portion of the patient population has multiple co-morbidities, with the highest number of patients (68, 34%) having two co-morbidities.

5.4. Departmental wise distribution: The department with the highest number of patients is Cardiology, with 89 patients accounting for 44.5% of the total. This is followed by Neurology (21 patients, 10.5%), Pulmonology (18 patients, 9%), and General Medicine (12 patients, 6%). Other departments, such as Orthopaedics, Gastroenterology, Urology, Oncology, Rheumatology, and Gynaecology, have smaller patient numbers.

5.5. Number of drugs prescribed per patient: The table reveals that the highest number of patients (60) received 5 drugs, accounting for 30% of the total. Other notable groups include 29 patients receiving 6 drugs (14.5%), 38 patients receiving 7 drugs (19%), and 23 patients receiving 8 drugs (11.5%). The chi-square value of 0.1 suggests a significant difference in the distribution of patients across the different drug prescription categories. The bar chart provides a visual representation of the data, clearly depicting the varying number of patients receiving different numbers of drugs.

The "Level of Medication Adherence" presents data on medication adherence levels among patients, categorized as poor, average, and good. The data is presented in a tabular format, along with a corresponding pie chart. According to the table, out of the total number of patients, 35.5% (71 patients) exhibited poor medication adherence, 20% (40 patients) had average adherence, and 44.5% (89 patients) showed good adherence. The chi-square values provided indicate the statistical significance of the observed differences in adherence levels.

5.6. Adherence Factors: According to the data, the most prevalent factor contributing to non-adherence is late intake, with 64% (128 patients) exhibiting this behaviour. Skipping medication doses is the second most common factor, with 55% (110 patients) engaging in this practice. Discontinuation of medication is also a significant factor, affecting 35% (70 patients). The usage of OTC medications, which can potentially interact with prescribed medications, was observed in 5.5% (11 patients) of the study population from Graph 2.



Graph 2: Adherence factors of observations

From Table 3, Correlation Co-efficient According to the data, gender has a perfect positive correlation (1) with the MMAS-8 Score, suggesting that gender plays a significant role in medication adherence. Age exhibits a strong negative correlation (-0.8) with the MMAS-8 Score, indicating that as age increases, medication adherence tends to decrease. The number of comorbidities has a strong positive correlation (0.7) with the MMAS-8 Score, implying that patients with multiple comorbid conditions tend to have better medication adherence. Conversely, the diagnosis variable has a moderate negative correlation (-0.4) with the MMAS-8 Score, suggesting that the nature of the diagnosis may influence medication adherence levels.

6. Conclusion:

The study highlights the critical issue of medication non-adherence among patients aged 45 and above in a tertiary care hospital setting. Late intake and skipping doses emerge as the most prevalent issues, potentially leading to suboptimal therapeutic effects and increased risk of complications. Discontinuation of medication and the concurrent use of OTC medications are also concerning factors that require attention. The positive correlation between the number of comorbidities and adherence may

reflect the increased health care engagement and monitoring associated with managing multiple chronic conditions. This study highlights the need for comprehensive interventions to improve medication adherence, particularly among the aging population. Continued research and collaborative efforts involving health care professionals, policymakers, and patients are crucial to overcome the challenges of non-adherence and optimize treatment outcomes.

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