

**OPTIMISING MEDICATION ADHERENCE IN THE SITUATIONS OF  
POLYPHARMACY AND POLYHERBACY****Dr. Gonepally Vaishnavi<sup>\*1</sup>, Mahankali Rajitha<sup>2</sup>, Bandari Divya<sup>2</sup>, Garrepalli Kavya Sree<sup>2</sup>, Donthi Akshitha<sup>2</sup>,  
Bompalli Srinidhi<sup>2</sup>, Nallavelli Sai charan<sup>2</sup> and Gonti Vishal<sup>2</sup>**<sup>\*1</sup>Vaageswari Institute of Pharmaceutical Sciences, Karimnagar-505481, Telangana, India.<sup>2</sup>Vaageswari Institute of Pharmaceutical Sciences, Beside LMD Police station, Ramakrishna Colony, Karimnagar 505481, Telangana, India.

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Pharmaceutical Sciences,  
Karimnagar-505481, Telangana,  
India.**ABSTRACT**

Poor adherence may have a major impact on clinical outcome, contributing to worsening of disease, increased health care costs and even death. With increasing numbers of medications leading to polypharmacy(PP) or polyherbacy(PH), low adherence is a growing concern. To study the medication adherence(MA) in patients with PP, PH and combination medication (allopathy + herbal ± OTC) and to assess and compare the impact of PP, PH and Over-the-counter (OTC) medication on MA and it's effects on multiple medicinal system users. This cross sectional study was conducted over a period of 6 months in 2025 to study the MA in patients with PP, PH and combination medication of Karimnagar region. The necessary data was collected using data collection form. In the overall study of 550 patients of different medicinal systems for medication adherence, 31-45 years age group was high(190) and low(24) in above 65 years. females (289) have higher MA when compared with males (263). farmers (117) have highest and employees (51) have lowest MA among all of them. educated (330) have higher MA when compared with uneducated (222). single diagnosis (390) have high MA when compared with multiple diagnostic patients (162).The people who are suffering with medication non-adherence mostly are in the age group of >65 years, males, employees, uneducated people and multiple diagnosis. It was found that the reasons for choosing multiple systems of medication are dissatisfaction, trust, cost, recommendations and ADRs with any of the medicinal system.

**KEYWORDS:** data collection form, allopathic drugs, herbal drugs, medication adherence.**INTRODUCTION****MEDICATION ADHERENCE**

Medication adherence can be defined as “the extent to which a person’s behaviour corresponds with taking a medicine optimally”. It is key to achieving therapeutic goals and improving patient outcomes. Whereas non-adherence leads to reduced clinical benefit and generates significant waste.<sup>[1]</sup>

Medication non-adherence poses significant problems, including treatment failure, disease progression, increased healthcare costs, and heightened risk of adverse events. Non-adherent patients may experience reduced therapeutic benefits, worsening symptoms, and complications, ultimately affecting their quality of life. Especially in cases of polypharmacy there has been an elevated risk of medication non-adherence. Thus, the inter connection between the medication adherence and polypharmacy has to be analysed.

Medication adherence (MA) is defined by the World Health Organisation (WHO) as “the degree to which the person’s behaviour corresponds with the agreed recommendations from a healthcare provider”.<sup>[2]</sup> Polypharmacy and polyherbacy along with combination medications can significantly impact medication adherence leading to reduced effectiveness of treatment, increased risk of adverse events, & compromised health outcomes.

**Importance of medication adherence**

**Improved treatment outcomes:** Taking medication as prescribed can lead to better disease management, reduced symptoms, and improved quality of life.

**Reduced risk of complications:** Adhering to medication regimens can help prevent complications, such as disease progression, hospitalization, and even death.

**Better disease control:** Consistent medication use can help control chronic conditions, such as diabetes, hypertension, and asthma.

**Reduced healthcare costs:** Adherence to medication can reduce healthcare costs by minimizing the need for hospitalizations, emergency department visits, and additional treatments.

**Enhanced patient-provider relationship:** Adhering to medication regimens demonstrates a commitment to one's health, fostering a stronger patient-provider relationship.

**Increased patient safety:** Adhering to medication regimens can reduce the risk of adverse events, such as medication errors and side effects.

### Medication non-adherence (MNA)

Not taking medication as prescribed (MNA) is a worldwide problem that causes serious health issues and financial burdens for both patients and society. Normally patients tend to miss the medication dose due to various reasons is termed as medication non-adherence.

According to the World Health Organization (WHO 2003), the five main factors contributing to nonadherence are;

- Socio-economic related
- Healthcare system related
- Disease related
- Therapy related
- Patient related

Polypharmacy and polyherbacy can negatively impact medication adherence due to the complexity of managing multiple medications and potential interactions. However, a comprehensive medication list can reduce these challenges by improving medication management, enhancing safety, and increasing patient understanding of their regimens. By tracking medications, dosages, and potential interactions, healthcare providers can optimize medication regimens, reduce adverse events, and promote adherence.

### POLYPHARMACY

Polypharmacy is defined as the use of multiple medications by a patient, but generally, it ranges from 5 to 10.<sup>[9]</sup> While another common definition describes polypharmacy as the use of minimum of 2 or more medications.<sup>[2]</sup>

In the study “polypharmacy prevalence in older adults seen in United States physician offices from 2009-2016” found that 65.1% of hospital visits included some form of polypharmacy with 36.8% having major polypharmacy (5 or more medications) (Eric H Young *et al.*, 2021).<sup>[3]</sup>

In another study “prevalence of polypharmacy, hyperpolypharmacy and potentially inappropriate medication use in older adults in India: A systemic review and meta analysis” reported a pooled prevalence of polypharmacy of 49% among older Indian adults (Akshaya S Bhagavathula *et al.*,2021).<sup>[4]</sup>

In the study “polypharmacy, polyherbacy and potential interactions among senior citizens pasodel north region” found that 38.46% of participants were taking 2 or more herbal products or supplements (Amanda M. Loya *et al.*,2006).<sup>[5]</sup>

### Risks from Polypharmacy

1. **Adverse Drug Reactions:** Compared to younger patients, elders who are taking some medication for a long time, and in higher doses, are vulnerable to adverse reaction which often need hospitalization. Such classes of drugs are like hypoglycemic agents, anti coagulants, NSAIDs etc.,

**Multiple Geriatric Syndromes:**<sup>[6]</sup> The adverse reactions of such drugs or drug interactions includes: Cognitive impairment, Fall, Urinary incontinence, Malnutrition.

2. **Drug-Drug Interactions:** When people take multiple medications, they can start to affect each other, leading to problems later on. For instance, if someone is taking between 5 and 9 different drugs, there's a 50% chance that these drugs will interact. If they take 20 or more medications, that chance goes up to 100%. This issue isn't just with regular medicines; it also happens with herbal remedies and vitamin supplements.

3. **Medication Non-Adherence:** As the number of drugs a patient has to take increases, his/her ability to comply with the dosage, and frequency also suffers. This is because of incidental issues like forgetfulness (of the schedule, or misplacing the prescription), reduced vision which causes a mix-up in the dosage or drugs taken, and poor dexterity in the finger which makes it difficult to break pills into half, or causes dropping of and hence losing some pills. Further, the patient may experience side effects (or) dislike its properties like taste etc., and avoid taking them.

The consequences from the polypharmacy negatively effect the patient health progress and his affordability such as multimorbidity, renal dysfunction, high rates of hospitalization, drug-related adverse drug reactions, Adverse drug event, increase in the healthcare cost.

### POLYHERBACY

Polyherbacy is a term that designates the ingestion of multiple herbal products. There is little information in the literature concerning the number of herbal products taken to constitute polyherbacy. In this study the criteria for the polyherbacy is taken as the use of more than 2 herbal supplements.<sup>[2]</sup>

Globally, the use of medicinal herbs has become a major part of healthcare. These plants are utilized not only to cure diseases but also to help maintain good health. In fact, about two-thirds of people around the world depend on herbal medicine as their main source of healthcare. Herbal therapy, which involves using natural products besides vitamins and minerals, is the most popular form of alternative medicine. People often choose herbal medicine because it's cheaper, aligns better with their beliefs, eases worries about the side effects of synthetic drugs, offers a more personalized approach to healthcare and makes health information easier for everyone to access. Most people use herbal remedies for long-term health issues rather than serious illnesses, and they also use them to promote better health.

Some commonly used medicinal herbs are

1. Ashwagandha(*Withania Somnifera*)
2. Aloe vera(*Aloe Barbadosis*)
3. Tulasi(*Ocimum Sanctum*)
4. Turmeric(*Curcuma Longa*)
5. Amla(*Embilca Officinalis*)

### Problems with Polyherbacy

Herbal medicine has several disadvantages, just as other complementary and alternative medical treatments. Some of them are

- Herbal medicines include so many chemical ingredients, utilizing them requires care and time, and one must be confident that their use won't cause an allergic reaction.
- Commercial herbal products that contain synthetic preservatives, which have been used for years, may have detrimental effects on one's health.
- Using synthetic substances has many disadvantages, including rising costs, handling risks, worries about residues in herbal products and damage to the environment.

Since there are not many studies were conducted regarding prevalence of polypharmacy and polyherbacy in relation to medication adherence in India, so there is a need to design updated medication management to improve medication adherence by conducting surveys to recognize the high risk individuals of polypharmacy, polyherbacy.

Main purpose of this study is to assess and analyse the reasons for the individuals who are opting for herbal products other medications over allopathic drugs and the extent of adherence in the patients with polypharmacy polyherbacy and combination medications to their prescription.

This study is cross sectional survey based in which collection of information from different group of individuals through their responses to Medication adherence questionnaire [MAQ] who are on many medications (polypharmacy, polyherbacy and combination medications) different systems of

medication or a single system of medication where the subjects in this study the age group from 18 and above is chosen.

One of the main reasons for picking this project is to find out how common polypharmacy and polyherbacy are when it comes to sticking to prescription. But a lot of the people are also internally dealing with problems related to polypharmacy and polyherbacy, along with other issues like having several chronic illnesses, memory problems, bad reactions to drugs and mostly being older.

### AIM AND OBJECTIVES

**AIM:** To study the medication adherence in patients with polypharmacy, polyherbacy and combination medication (allopathy + herbal ± OTC).

### OBJECTIVES

- ❖ To assess and compare the impact of polypharmacy, polyherbacy and OTC medication on medication adherence.
- ❖ To compare the medication adherence in different groups of patients based on age, gender, occupation and diagnosis who is on polypharmacy, polyherbacy and OTC medication.
- ❖ To assess the reasons to choose one medication system over the other which may be a common barrier contributing to medication non-adherence.

### METHODOLOGY

The study was conducted in different age groups of out-patients in hospitals, pharmacies and neighbourhood.

### Study Designs

The study is a cross sectional study (quantitative survey based questionnaires).

### Study Duration

The study was conducted over a period of 6 months.

### Inclusion Criteria

- The people who are above 18 years of age.
- Out-patients.
- People with polypharmacy, polyherbacy and combination of medication like OTC.

### Exclusion Criteria

- Pregnant and lactating women.

### Sources of data

Data collected from the out-patient prescriptions and surveying those who are attaining the pharmacies, hospitals and also from neighbourhood in Karimnagar region.

### PROCEDURE

Data collection and analysis of study

The survey was conducted using a data collection form which includes questions about demographic details such as person's name, age, gender, education, occupation,

residentiality with their differential diagnosis/disease status and details regarding the prescription medications of allopathy and/or herbal medications and/or over the counter (OTC) drugs along with their ADRs, reasons for choosing herbal medications over allopathic drugs and vice versa and the type of medicinal system which satisfied the patient most.

It also contains a questionnaire called Morisky Medication Adherence Questionnaire scale (MMAQS-8) (by Dr.Donald Morisky (1983) and others) used to measure the adherence consisting of 8 items of questions relating to information about regular usage of prescribed medications, forgetfulness, carelessness, stopping medication when feeling better or worse, difficulty in remembering medication, difficulty in obtaining medication or avoiding, feeling hassled about sticking to

the prescription etc,. The respondents were asked to mark one of the options including “ yes” or “ no”. Scores are calculated by summing the total no. of correct answers. In the 8 item scale, 8 points was considered as high adherence, 6-7 as medium adherence and 5 points or less as low adherence.

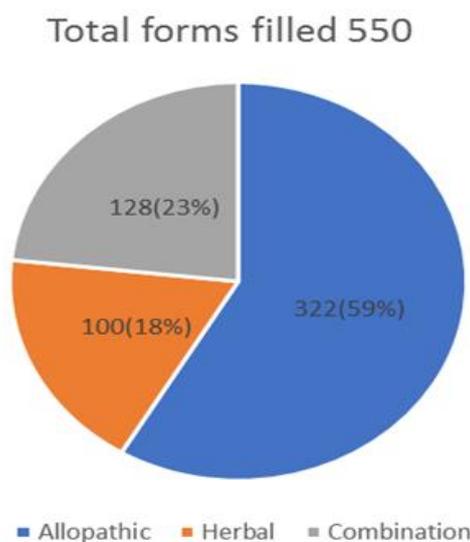
The data was analysed based on information obtained from the responses to the questionnaires from different group of people on polypharmacy, polyherbacy and combination medicine ±OTC are categorised and compared for the level of medication adherence in different ages, gender, occupation, education and diagnosis and also to find the reasons for the shift from one medication system to other. The obtained results were represented using tables, graphs and pie charts.

**RESULTS**

**Pie chart**

**Table 1.1: Table shows results of different medication systems.**

Medication system	Number of forms
allopathic	322(59%)
Herbal	100(18%)
Combination	128(23%)



**Figure 1.1: Pie Chart Shows Results of Different Medication Systems.**

Based on above data we identified that, around 550 people are participated in the study. Of them 322 (58%)

were allopathic, 100 (18%) were herbal and 128 (23%) were combinations (allopathy + herbal)

**Table 2.1: Table shows MMAQs result in different age groups in polypharmacy.**

Age	Low adherence	Medium adherence	High adherence
18-30	46 (14.06%)	49 (14.98%)	5 (1.52%)
31-45	50 (15.29%)	51 (15.59%)	9 (2.75%)
46-65	54 (16.51%)	37 (11.31%)	8 (2.44%)
Above 65	12 (3.66%)	5 (1.52%)	1 (0.30)

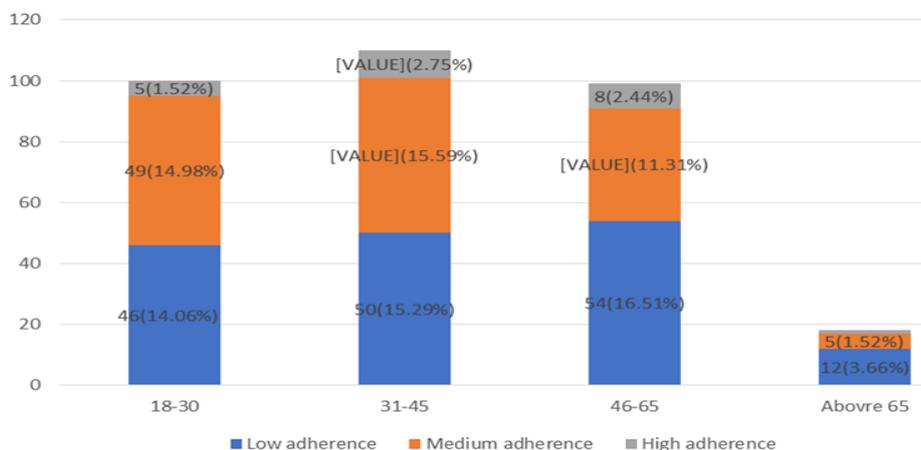


Figure 2.1: Graph shows MMAQs result in different age groups in polypharmacy.

Based on above data we identified that, low adherence score was high 54(16.51%) in 46-65years age group and low 12(3.66%) in above 65 years age group, high adherence score was high 9(2.7%) in 31-45 years age group and low 1(0.3%) in above 65 years age group.

We found that, in 322 cases, low adherence score was high in all age groups when compared with high adherence score.

Table 2.2: Table shows MMAQs results between male and female in polypharmacy.

Gender	Low adherence	Medium adherence	High adherence
Male	76 (23.24%)	80 (24.46%)	14 (4.28%)
Female	86 (26.29%)	63 (19.26%)	8 (2.49%)

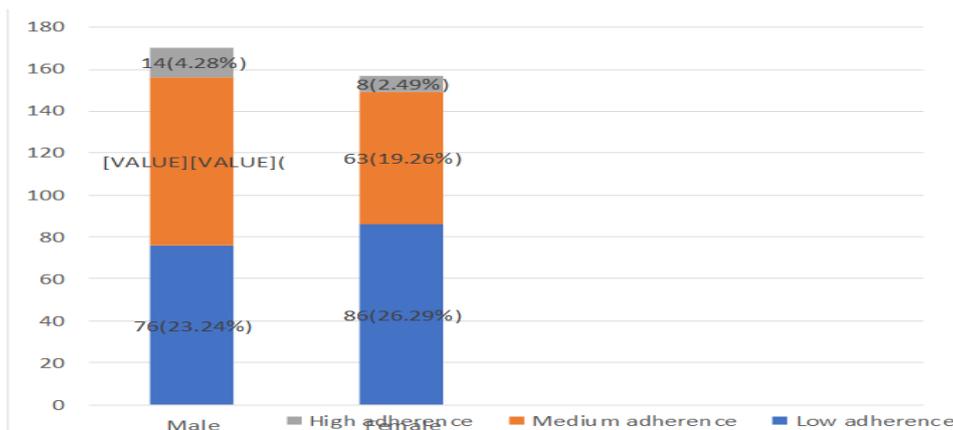


Figure 2.2: Graph shows MMAQs results between male and female in polypharmacy.

Based on above data we identified that, low adherence score was high 86 (26.29%) in female and low 76(23.24%) in male, high adherence score was high 14(4.28%) in male and low 8(2.44%) in female.

We found that, low adherence score was highest in female when compared with male and high adherence score was highest in male when compared with female.

Table 2.3: Table Shows MMAQs Results in Different Categories in Polypharmacy.

Categories	Low adherence	Medium adherence	High adherence
Student	18(5.5%)	14(4.28%)	3(0.91%)
Employee	10(3.05%)	16(4.89%)	3(0.91%)
Business	11(3.36%)	19(5.81%)	3(0.91%)
Labour	27(8.25%)	15(4.58%)	1(0.30%)
Housewife	32(9.78%)	22(6.72%)	3(0.91%)
Farmer	36(11.0%)	37(11.31%)	7(2.14%)
Unemployed	28(8.56%)	19(5.81%)	3(0.91%)



Figure 2.3: Graph shows MMAQs results in different categories in polypharmacy.

Based on above data we identified that, low adherence score was high 36(11.0%) in farmers and low 10(3.05%) in employees, high adherence score was high 7(2.14%)

in farmer and low 1(0.30%) in labours. We found that, low and high adherence score was highest in farmers when compared with other categories.

Table 2.4: Table shows MMAQs results between educated and uneducated in polypharmacy.

Education	Low adherence	Medium adherence	High adherence
Educated	84(25.6%)	88(26.9%)	13(3.97%)
Uneducated	78(23.8%)	54(16.5%)	10(3.05%)

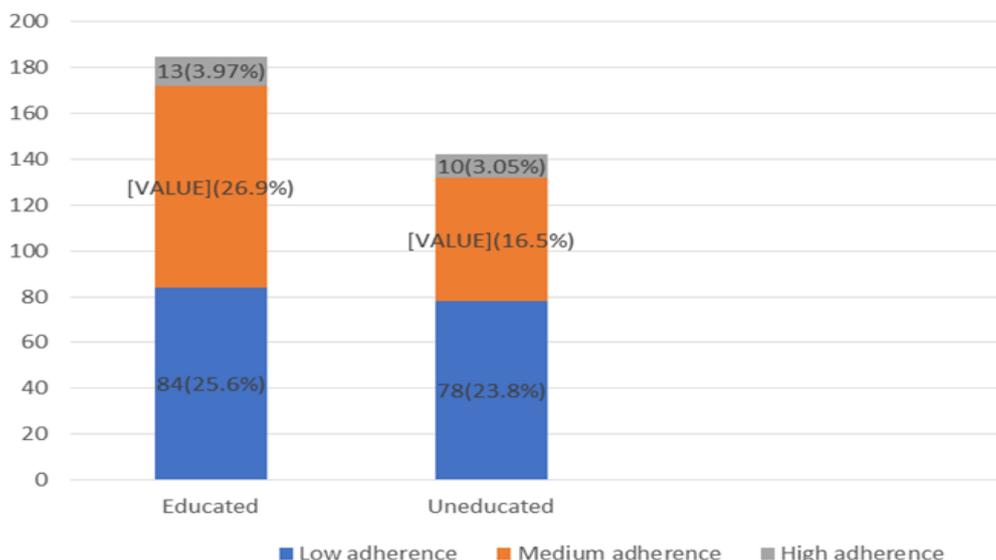


Figure 2.4: Graph Shows MMAQs Results Between Educated and Uneducated in Polypharmacy.

Based on above data we identified that, low adherence score was high 84(25.6%) in educated and low 78(23.8%) in uneducated, high adherence score was high 13(3.97%) in educated and low 10(3.05%) in uneducated.

We found that, educated have higher adherence when compared with uneducated.

Table 2.5: Table shows MMAQs results between single and multiple diagnosis in polypharmacy.

Diagnosis	Low adherence	Medium adherence	High adherence
Single diagnosis	107(32.7%)	107(32.7%)	18(5.5%)
Multiple diagnosis	55(16.8%)	35(10.7)	5(1.52%)

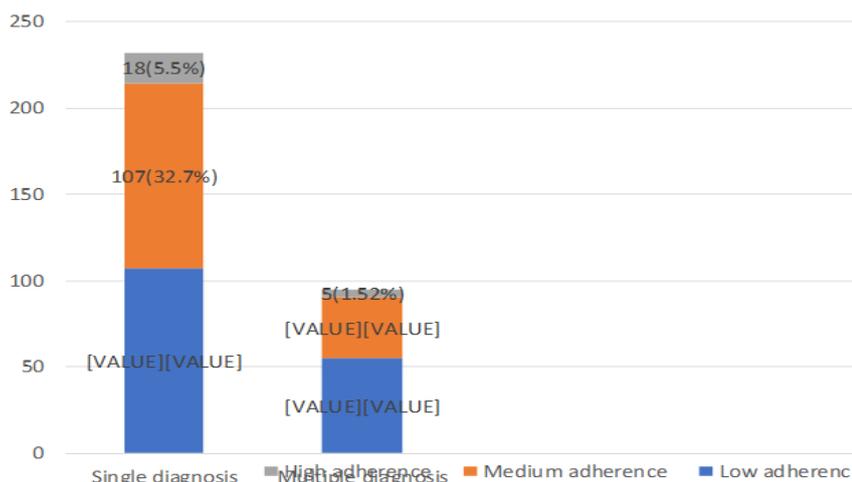


Figure 2.5: Graph Shows MMAQs Results Between Single and Multiple Diagnosis in Polypharmacy

Based on above data we identified that, low adherence score was high 107(32.7%) in single diagnosis and low 55(16.8%) in multiple diagnosis, high adherence score was high 18(5.5%) in single diagnosis and low 5(1.52%)

in multiple diagnosis. We found that, single diagnosis have higher adherence when compared with multiple diagnosis.

Table 3.1: Table shows MMAQs results in different age groups in polyherbacy.

Age	Low adherence	Medium adherence	High adherence
18-30	23(24.21%)	11(11.57%)	4(4.21%)
31-45	22(23.15%)	10(10.52%)	3(3.15%)
46-65	14(14.7%)	7(7.36%)	0(0%)
Above 65	1(1.05%)	0(0%)	0(0%)

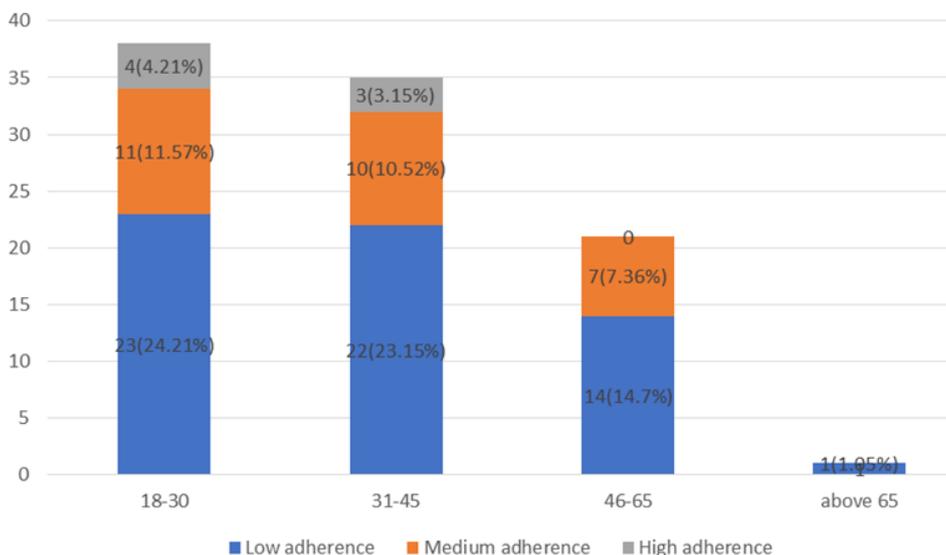


Figure 3.1: Graph shows MMAQs results in different age groups in polyherbacy

Based on above data we identified that, low adherence score was high 23 (24.21%) in 18-30 years age group and low 1 (1.05%) in above 65 years, high adherence score was high 4 (4.21%) in 18-30 years age group and low 0 (0%) in 46-65 years age group and above 65 years.

According to Morisky scores, we found that low adherence score is high in all age groups.

Table 3.2: Table shows MMAQs results between male and female in polyherbacy.

Gender	Low adherence	Medium adherence	High adherence
Male	24(25.2%)	9(9.47%)	2(2.1%)
Female	36(37.89%)	19(20%)	5(5.26%)

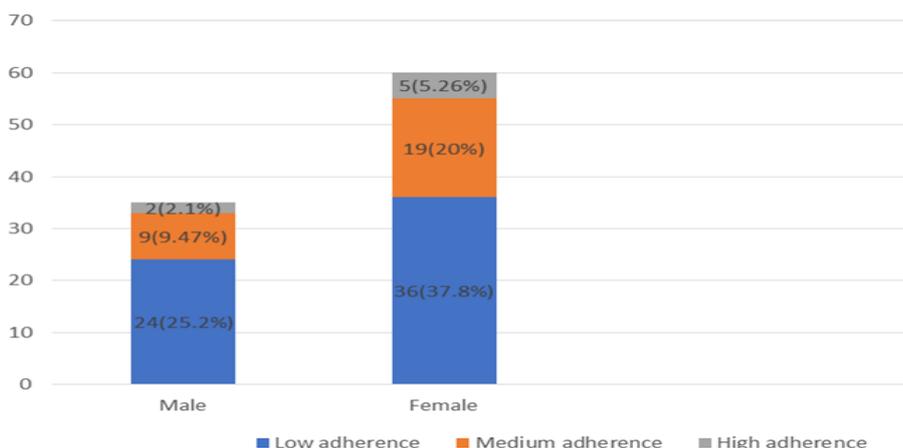


Figure 3.2: Graph shows MMAQs results between male and female in polyherbacy.

Based on above data we identified that, low adherence score was high 36 (37.89%) in female and low 24 (25.2%) in male, high adherence score was high 5 (5.26%) in female and low 2 (2.1%) in male.

We found that, female have higher adherence score when compared with male.

Table 3.3: Table shows MMAQs results in different categories in polyherbacy

Categories	Low adherence	Medium adherence	High adherence
Student	7(7.36%)	5(5.26%)	4(4.21%)
Employee	4(4.21%)	0(0%)	1(1.05%)
Farmer	10(10.42%)	3(3.15%)	1(1.05%)
Business	6(6.31%)	3(3.15%)	0(0%)
Labour	4(4.21%)	3(3.15%)	0(0%)
Housewife	17(17.89%)	8(8.42%)	1(1.05%)
Unemployed	12(12.63%)	6(6.31%)	0(0%)

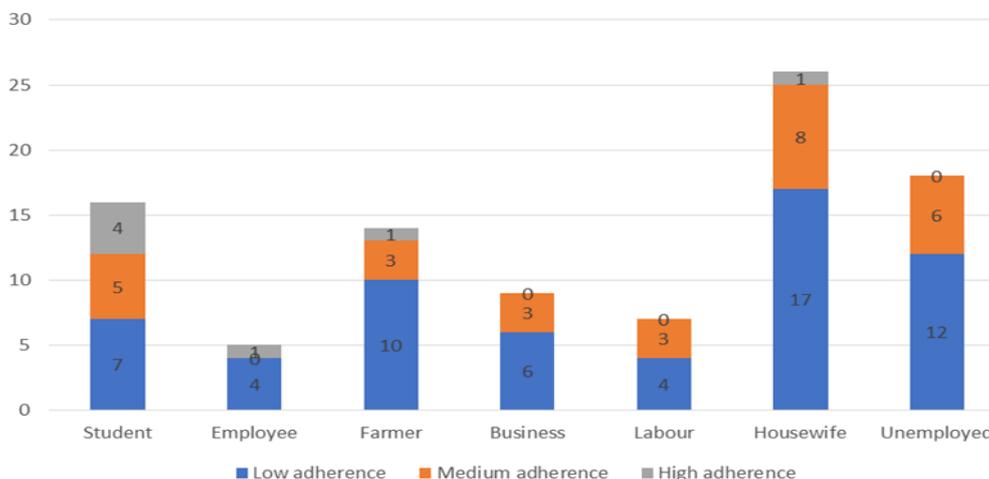


Figure 3.3: Graph shows MMAQs results in different categories in polyherbacy.

Based on above data we identified that, low adherence score was high 17 (17.89%) among housewife and low 4 (4.21%) among employees and labours, high adherence score was high 4 (4.21%) among students and low 0 (0%) among business, labour, unemployed.

We found that, low adherence score was highest in housewife and lowest in employees and high adherence score is lowest in business, labour and unemployed.

Table 3.4: Table shows MMAQs results between educated and uneducated in polyherbacy.

Education	Low adherence	Medium adherence	High adherence
Educated	34(35.78%)	20(21.05%)	6(6.31%)
Uneducated	26(27.36%)	8(8.45%)	1(1.05%)

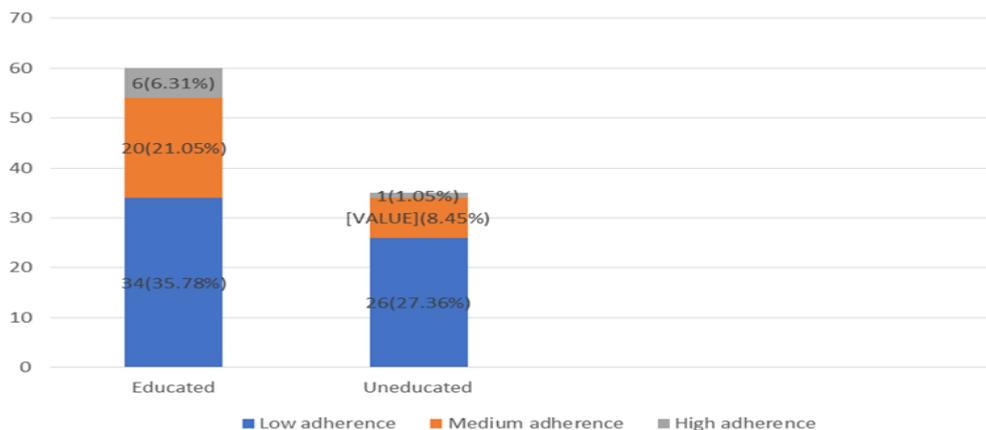


Figure 3.4: Graph shows MMAQs Results Between Educated and Uneducated in Polyherbacy.

Based on above data we identified that, low adherence score was high 34(35.78%) in educated and low 26(27.36%) in uneducated, high adherence score was high 6(6.31%) in educated when compared with uneducated.

We found that, low adherence score is high in both groups when compared with high adherence.

Table 3.5: Table shows MMAQs results between single and multiple diagnosis in polyherbacy.

Diagnosis	Low adherence	Medium adherence	High adherence
Single	47(49.47%)	25(26.31%)	6(6.31%)
Multiple	13(13.68%)	3(3.15%)	1(1.05%)

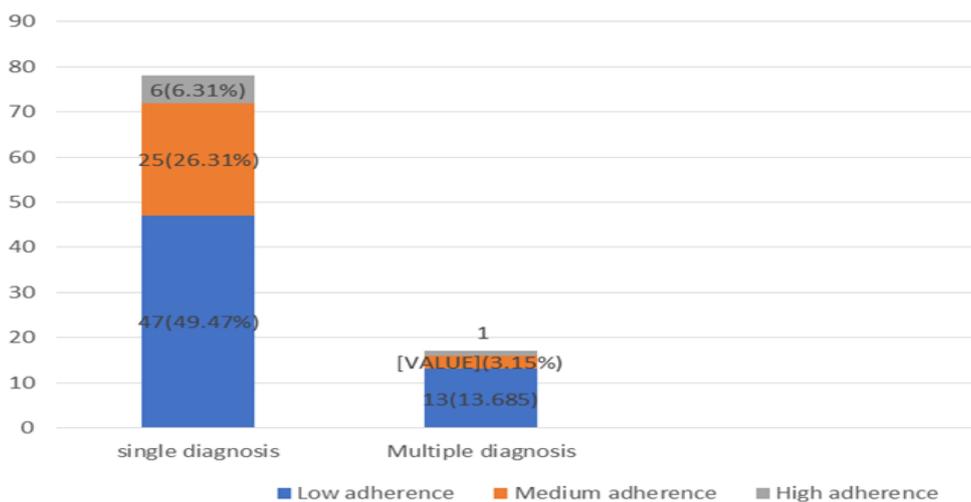


Figure 3.5: Graph shows MMAQs results between single and multiple diagnosis in polyherbacy.

Based on above data we identified that, low adherence score was high 47 (49.47%) in single diagnosis and low 13 (13.68%) in multiple diagnosis, high adherence score was high 6 (6.31%) in single diagnosis and low 1 (1.05%) in multiple diagnosis.

We found that, single diagnosis have higher adherence compare with multiple diagnosis.

Table 4.1: Table shows MMAQs results in different age groups in combination system.

Age	Low adherence	Medium adherence	High adherence
18-30	10 (7.6%)	19 (14.6%)	8 (6.1%)
31-45	14 (10.7%)	25 (19.2%)	6 (4.6%)
46-65	19 (14.6%)	21 (16.1%)	3 (2.3%)
Above 65	5 (3.8%)	0 (0%)	0 (0%)

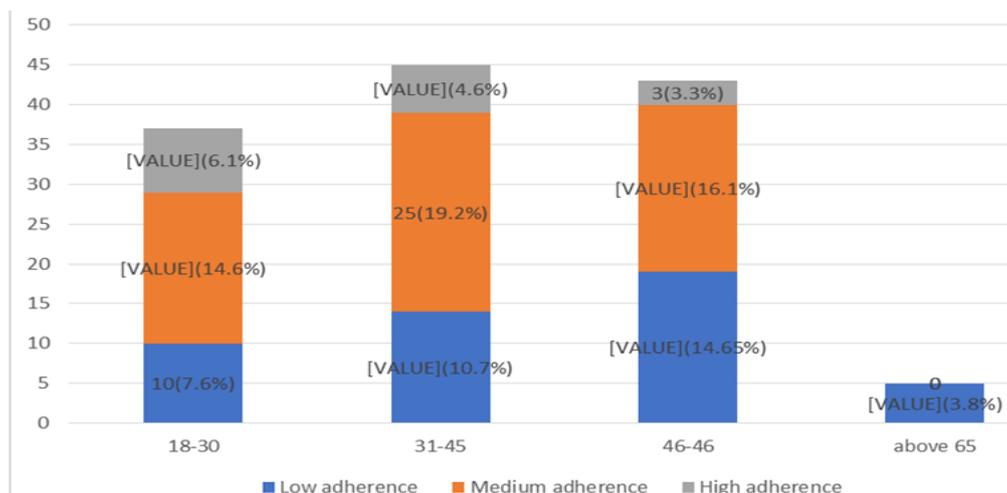


Figure 4.1: Graph shows MMAQs results in different age groups in combination system.

Based on above data we identified that, low adherence score was high 19(14.6%) in 46-65years age group and low 5(3.8%) in above 65 years age group, high adherence score was high 8(6.1%) in 18-30 years age group and low 0(0%) in above 65 years age group.

According to Morisky scores, we found that, in 128 cases medium adherence score was high when compared to all the age groups.

Table 4.2: Table shows MMAQs results between male and female in combination system.

Gender	Low adherence	Medium adherence	High adherence
Male	30 (23.07%)	24 (18.46%)	4 (3.07%)
Female	18 (13.84%)	41 (31.5%)	13 (10%)

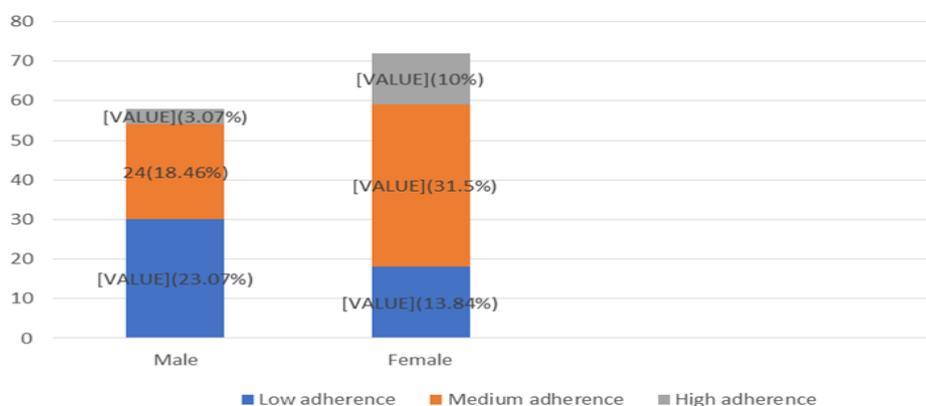


Figure 4.2: Graph shows MMAQs results between male and female in combination system.

Based on above data we identified that, low adherence score was high in male 30(23.07%) and low in female 18(13.84%), high adherence score was high in female 13(10%) and low in male 4(3.07%).

We found that, high adherence score was highest in female when compared with male.

Table 4.3: Table shows MMAQs results in different categories in combination system.

Categories	Low adherence	Medium adherence	High adherence
Student	1 (0.76%)	6 (4.61%)	5 (3.84%)
Employee	6 (4.61%)	7 (5.38%)	4 (3.075)
Business	6 (4.61%)	5 (3.84%)	2 (1.53%)
Labour	12 (9.23%)	9 (6.92%)	2 (1.53%)
Housewife	4 (3.07%)	11 (8.46%)	2 (1.53%)
Farmer	11 (8.46%)	10 (7.69%)	2 (1.53%)
Unemployed	8 (6.15%)	17 (13.07%)	0 (0%)

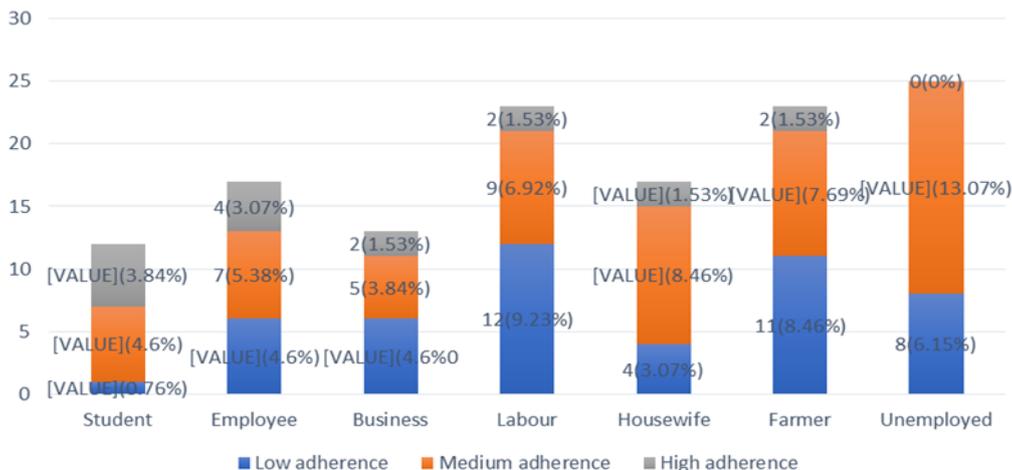


Figure 4.3: Graph shows MMAQs results in different categories in combination system

Based on above data we identified that, low adherence score was high in 12(9.23%) in labour and low 1(0.76%) in students, high adherence score was high 5(3.84%) in students and low 0(0%) in unemployed.

We found that, low adherence score was high in all occupations except students.

Table 4.4: Table shows MMAQs results between educated and uneducated in combination system.

Education	Low adherence	Medium adherence	High adherence
Educated	30 (23.07%)	44 (33.84%)	11 (8.46%)
Uneducated	18 (13.84%)	21 (16.15%)	6 (4.61%)

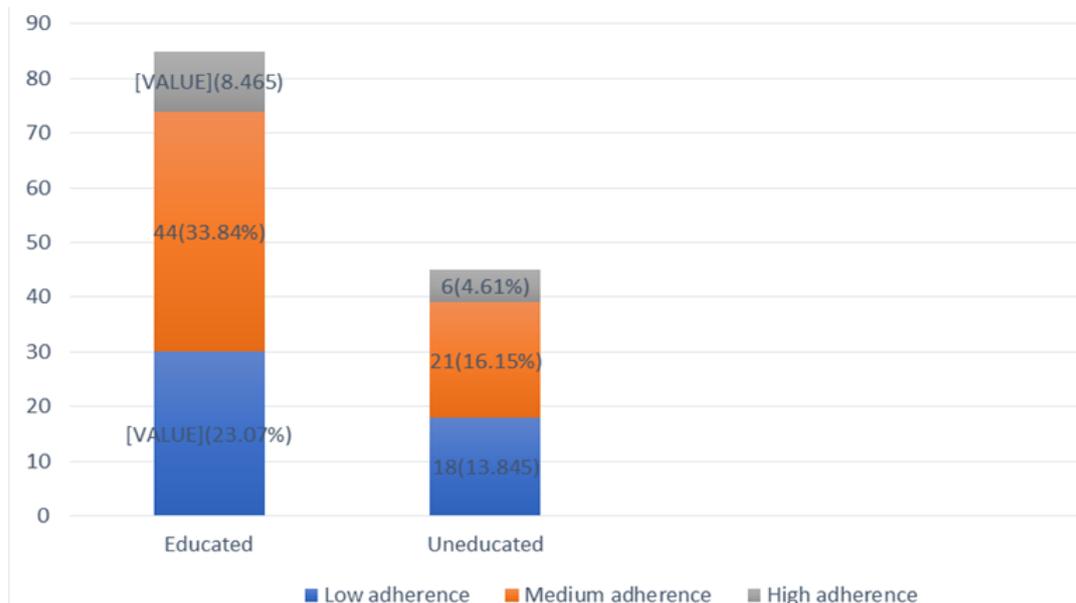


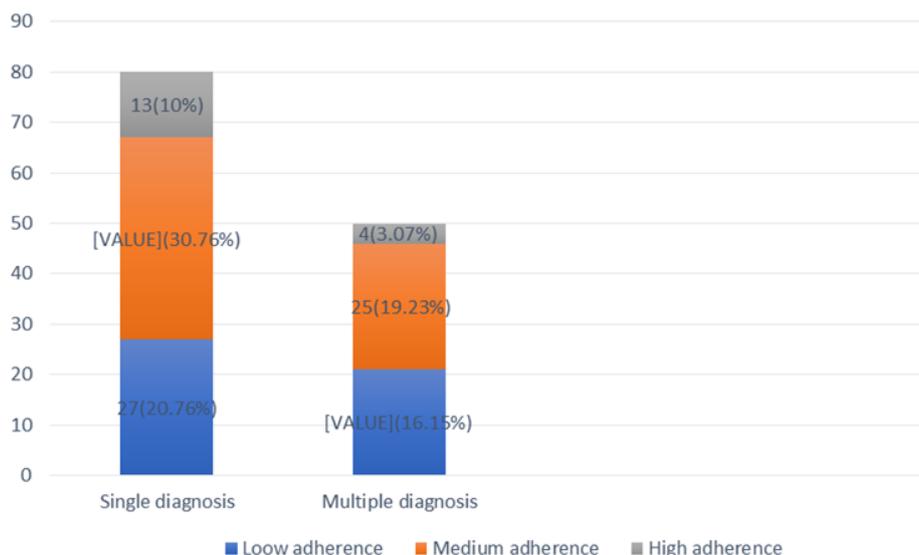
Figure 4.4: Graph shows MMAQs results between educated and uneducated in combination system

Based on above data we identified that, low adherence score was high 30(23.07%) in educated and low 18(13.84%) in uneducated, high adherence score was high 11(8.46%) in educated and low in 6(4.61%) in uneducated.

We found that, educated have higher adherence when compared with uneducated.

Table 4.5: Table shows MMAQs results between single and multiple diagnosis in combination system.

Diagnosis	Low adherence	Medium adherence	High adherence
Single	27 (20.76%)	40 (30.76%)	13 (10%)
Multiple	21 (16.15%)	25 (19.23%)	4 (3.07%)



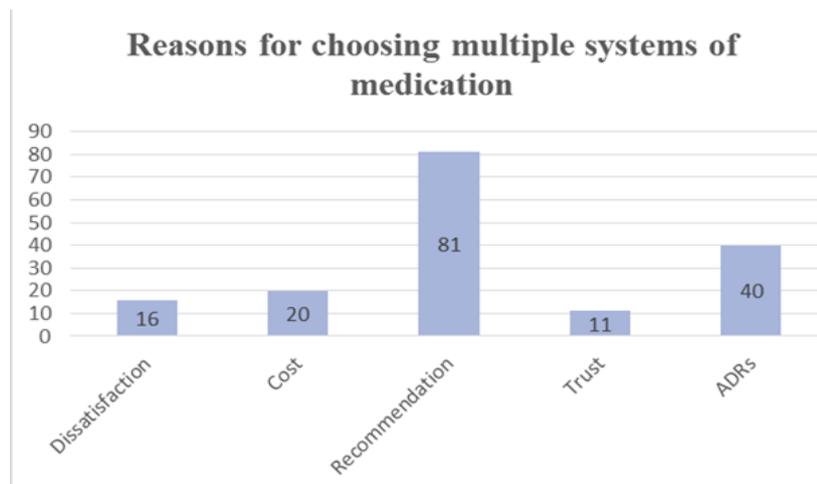
**Figure 4.5: Graph Shows MMAQs Results Between Single and Multiple Diagnosis in Combination System.**

Based on above data we identified that, low adherence score was high 27(20.76%) in single diagnosis and low 21(16.15%) in multiple diagnosis, high adherence score was high in female 13(10%) in single diagnosis and low in 4(3.07%) multiple diagnosis.

We found that, high adherence score was high in single diagnosis when compared with multiple diagnosis.

**Table 4.6: Table shows that reasons for choosing multiple systems of medication.**

Reason	Number of forms
Dissatisfaction	16
Cost	20
Recommendation	81
Trust	11
ADRs	40



**Figure 4.6: Graph shows the reasons for choosing multiple systems of medication.**

Based on above data we identified that, dissatisfaction (16), cost (20), recommendation (81), trust (11), ADR's (40) are the reasons for choosing multiple systems of medication.

We found that, recommendations are higher among all of them.

**DISCUSSION**

In our study we collected 550 prescriptions from participants suffering with different diseases and using different systems of medications like allopathic, herbal and combination (Allopathic+Hebal+OTC). From this, we found that allopathic (322), herbal (100) and combinations (128), within herbal, ayurvedic (72) and

homeopathic (28) {prescription/non-prescription}. Combination which includes allopathic and herbal.

Carlotta Franchi, et.al., done a study on “Medication adherence in community dwelling in older people exposed to chronic polypharmacy” demonstrated that among 1,40,537 patients included in the cohort retrospective study,  $\geq 80$  years old (95%) were associated with an lower adherence score. Instead, the participant to an experimental health care programme was associated with higher adherence score (95%). This study concluded that low medication adherence in community dwelling in older people on chronic polypharmacy.

In our study out of 322 cases of polypharmacy, we have included that survey has participants of adult age from 18. It is observed that, low adherence score was high in all age groups when compared with high adherence score. The low adherence score was high 54 (16.51%) in 46-65 years age group and low 12 (3.66%) in above 65 years. Medium adherence score was high 51 (15.5%) in 31-45 years age group and low 5 (1.52%) in above 65 years. High adherence score was high 9 (2.7%) in 31-45 years age group and low 1 (0.3%) in above 65 years.

Comparing the overall study of different systems (allopathic, herbal, combination), The medication adherence was high in both cases of polypharmacy (110), and combinational medicines (45) in the age group of 31-45 years, meanwhile medication adherence was high in polyherbacy (38) in the age group of 18-30 years. The medication adherence was high in females in all the cases of polypharmacy (157), polyherbacy (60) and combinational medicines (72) when compared with males. The medication adherence was high in farmers (80) in polypharmacy, housewives (26) in polyherbacy and unemployed (25) in combinational medicines. The medication adherence was high in educated people in all the cases of polypharmacy (185), polyherbacy (60) and combinational medicines (85) when compared with uneducated people. The medication adherence was high in single diagnosis in all the cases of polypharmacy (232), polyherbacy (78) and combinational medicines (80) when compared with multiple diagnosis.

## CONCLUSION

The people who are suffering with medication non-adherence mostly are in the age group of  $>65$  years, males, employees, uneducated people and multiple diagnosis in case of polypharmacy, polyherbacy and combination system due to the reasons of forgetfulness, busy at work, no education or by using multiple number of medicines. It was found that the reasons for choosing multiple systems of medication are dissatisfaction, trust, cost, recommendations and ADRs with any of the medicinal system.

To tackle medication non-adherence (MNA) in polypharmacy or polyherbacy or both, we suggest to

simplify medication regimens, educate patients about their medications and involve family members or caregivers in medication management. Additionally, healthcare providers should assess patient's understanding of their medications and address any concerns or barriers to adherence.

## REFERENCE

1. Dwajani S, Prabhu MR, Ranjana G, et.al, Importance of medication adherence and factors affecting it. International journal of compressive advanced pharmacology, 2018; 3(2): 69-77. <https://doi.org/10.18231/2456-9542.2018.0018>.
2. Amanda M Loya, et.al, Prevalence of polypharmacy, polyherbacy, nutritional supplement use and potential product interactions among older adults living on the United States – Mexico border: A Descriptive, Questionnaire Based Study, 2009.
3. Eric H Young, et.al, Polypharmacy prevalence in older adults seen in United States physician offices from 2009 to 2016, 2021.
4. Akshaya S Bhagavathula, et.al, Prevalence of polypharmacy, hyperpolypharmacy and potentially inappropriate medication use in older adults in India: A systematic review and meta analysis, 2021. <http://dx.doi.org/10.3389/fphar.2021.685518>.
5. Amanda M. Loya et.al, Polypharmacy, polyherbacy and potential interactions among senior citizens in the Paso del Norte region, 2006.
6. Polypharmacy in the elderly: Risks, benefits, management strategies- Kauvery Hospital, June 2023.
7. Oman Med J, Patient medication adherence: measures in daily practice, 2011 March; 26(3): 155-159. doi: 10.5001/omj.2011.38.
8. World Health Organization, Adherence to long-term therapies: evidence for action, Geneva: World Health Organization; 2003.
9. Butler JA, Roderick P, Mullee M, et.al, Frequency and impact of non adherence to immunosuppressant's after renal transplantation: a systemic review, Transplantation, 2004. <http://dx.doi.org/10.1097/01.TP.0000110408.83054.88>
10. Osterberg L, Blaschke T, Adherence to medication, 2005; 353: 487-97.
11. New England Healthcare Institute, Thinking outside the pill-box: a system-wide approach to improving patient medication adherence for chronic disease, Nov 2010.
12. Marie A. Chischolm-Burns and Christina A. spivey, The ‘cost’ of Medication non adherence: consequences we cannot afford to accept, Journal of American pharmacists association, Sep 2011. <https://doi.org/10.1331/JAPhA.2012.11088>
13. Gupta R, et.al, A study on polypharmacy among elderly medicine in-patients of a tertiary care teaching hospital of North India, Jan 2018, National Journal of Physiology Pharmacy and Pharmacology

- 8(9): 1. Ramesh Adepu, Community pharmacy practice, 61-65.
14. Isaac John Umaru, Saad Ismail Shuaibu, et.al, Effect of herbal medicine and it's Biochemical implication, May 2020.
  15. Zachary A Marcum, et.al, Medication adherence to multi drug regimens, 2012 May; 28(2): 287-300.
  16. Emren, et.al, Drug adherence in patients with non-valvular atrial fibrillation taking nonvitamin k antagonist oral anticoagulants in Turkey: NOAC-TR, April, 2018. doi: 10.1177/1076029617693940.
  17. Specialist pharmacy service, defining and understanding medication adherence, Dec 2023.
  18. T Tamilselvan, et.al, Incidence of polypharmacy and drug related problems among Geriatric patients in a multi-speciality hospital, August 2018, International Journal of Research and Development in Pharmacy and Life Sciences 7(4): 3055-3059. DOI: <http://dx.doi.org/10.21276/IJRDPL.2278-0238>. 2018; 7(4): 3055-3059.
  19. Todd M Ruppert, et.al, J Am Heart Association, Medication adherence interventions improve heart failure mortality and readmission rates: A systematic review and met analysis of controlled trials, Journal of the American Heart Association 5(6): 2016.
  20. Hitesh Chaudhary, et.al, Association between quality of life and drug adherence among patients with diabetes, 2004, DOI:<https://doi.org/10.7759/cureus.71300>
  21. G Parthasarathi, Karin Nyfort Hansen and Milap C Nahata, A textbook of clinical pharmacy practice, Essential concepts and skills, 2<sup>nd</sup> edition, 74-84.
  22. Upkar Varshney, Smart medication management system and multiple interventions for medication, 2013; 538-551.
  23. Kirsi kvarnstrom, Aleski Westerholm et.al, Factors contributing to medication adherence in patients with a chronic condition: A scoping Review of Qualitative research; 2021. DOI:<https://doi.org/10.3390/pharmaceutics130711>.