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MEDICATION ADHERENCE AND POLYPHARMACY RISKS IN ELDERLY CARDIAC PATIENTS

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Abstract

Two of the most critical aspects, which influence the health of elderly individuals with heart issues, are medication adherence and polypharmacy, particularly in individuals with a large number of health issues and a complex treatment regimen. This paper analysed compliance behaviours, drug burden and polypharmacy related risk indicators in a group of elderly individuals undergoing chronic cardiac treatment. The results of nine detailed analytical tables and twelve advanced visual models suggested that adherence behaviours exhibited a great heterogeneity and approximately 40-45% of the subjects experienced moderate adherence and more than 30% were high-risk non-adherents. The majority of the patients were taking more than single medicine, with the range of 5 to 10 meds most widely used. Age has shown positive relationship with number of medications; however the growing drug load was a consistent relationship with the increasing adverse drug interaction risk scores. Additional visualisations that included scatter and hybrid size underscored the concentration of the high-risk groups in relation to older age groups (≥75 years), as these age groups are cumulative based on age, comorbidity, and complexity of the drugs. Frequency study also indicated that individuals that were given over seven medications in one day missed drug doses most. This is an indication that behaviour is directly influenced by the complexity of the regimen. Hybrid risk-adherence models showed a strong negative correlation between the percent of adherence and the index of polypharmacy severity. The overall findings indicate that polypharmacy does not only increase the risk of drug interactions but also intensifies the ability of older individuals with heart issues to adhere to their medications making them more susceptible within the clinical environment. These results support the imperative need to implement adherence-support therapies, simplification regimen strategies, and close observation of high-risk individuals to reduce the adverse effects in geriatric heart car

Keywords: Medication Adherence, Polypharmacy, Elderly Cardiac Patients, Cardiovascular Pharmacotherapy, Risk Scoring, Adverse Drug Interactions.

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INTRODUCTION

Polypharmacy, which is usually associated with the usage of numerous medications simultaneously, is a common issue in elderly cardiac patients that significantly contributes to the adverse drug events, readmission to hospitals, and reduction of adherence to medications (Li et al., 2023) (Abdelbary et al., 2023). What makes this even more complicated is that the prevalence of multimorbidity in this population is also very high, with more than 90% of geriatric patients having multiple chronic diseases and more than 70% being exposed to polypharmacy, making it all the more important that complex approaches to medication management are needed (Mekdad et al., 2024). Most of the population is over 65 (31.4 in 2018) in such regions as Qatar, which means that the healthcare system faces significant difficulties with complex heart issues, polypharmacy, and frailty (Abdelbary et al., 2023). The cardiovascular diseases remain to be one of the leading causes of mortality and morbidity in the world, and the number of cases almost doubles and the number of deaths increases drastically between 1990 and 2019, which highlights the growing burden on the healthcare systems (Kalash et al., 2023). This population shift, combined with the necessary issues regarding the management of cardiovascular disease, precondition the importance of learning all possible details on the impact of polypharmacy on the compliance of older adults to their treatment and the quality of their health (Kalash et al., 2023). Polypharmacy among older patients with cardiovascular disease has been reported to be ranging between 17.2% and 88.6 in the Middle East and North Africa, which is a severe problem in the region (Abdelbary et al., 2023). The high rate of polypharmacy among cardiac patients should be thoroughly investigated in terms of its specific implications and, in particular, the increased risk of drug-drug interactions and their impact on general health outcomes (Sheikh-Taha and Asmar, 2021). Such interactions may complicate prescription regimens, which has been associated with unequal clinical outcomes in certain studies (Abdelbary et al., 2023). Indicatively, the cases of drug-drug interactions that are potentially dangerous are prevalent among hospitalised patients with cardiac issues, and some research indicated that up to 79.5% of them had such interactions (Kalash et al., 2023). These interactions are commonly associated with drugs, which a person is used to taking to treat heart problems, thereby complicating treatment even more (Sheikh-Taha and Asmar, 2021). The numerous interactions between

numerous drugs may lead to unexpected side effects of drugs, worsening underlying comorbidity and potentially decreasing the efficiency of the needed cardiovascular interventions (Anfinogenova et al., 2023). This is particularly significant since cardiovascular disease is frequently associated with multimorbidity, which results in polypharmacy, particularly in individuals older than 65 who are also more prone to developing safety problems due to drugs (Villén et al., 2022) (Schwartz et al., 2018). These issues have been exacerbated by the increase of life expectancy and advances in the treatment of the cardiovascular. It has altered the impact of cardiovascular disease on individuals and made it more difficult to diagnose patients (Aïdoud et al., 2023). It is essential to identify the high-risk groups of polypharmacy among patients with cardiovascular disease to decrease such issues and decrease the severity of comorbidities related to cardiovascular disease (Mohsenzadeh et al., 2022). The treatment of patients with cardiovascular conditions is difficult by default because of numerous comorbidities and complex therapy regimens that make them particularly predisposed to drug-drug interactions (Akbar et al., 2021). It is augmented by the large amounts of 3- to 9-medicine prescribed to cardiovascular diseases, which significantly increase the risk of possible drug-drug interactions (pDDIs), and prevalence rates were reportedly so high in specific regions (Sahoo et al., 2023). The significance of such interactions is huge because it may result in the decline of the effect of the drug, the increase of side effects, and unsatisfactory outcomes of the treatment. In other instances, they are even life-threatening (Sheikh-Taha and Asmar, 2021). This difficulty is also complicated by the fact that an interdisciplinary approach to the treatment of cardiovascular patients with multiple chronic conditions requires the cardiologists to be aware of the treatments that are prescribed by different specialists in order to prevent adverse drug reactions (Anfinogenova et al., 2023). What is more, physiological alterations that accompany ageing, such as alterations in the process of drug elimination and decomposition, increase the risk of bad drug reactions of older cardiac patients receiving many drugs (Anfinogenova et al., 2023). This susceptibility provides significant insight into the key need of careful medication reconciliation and customized pharmacotherapeutic strategies tailored to unique physiological peculiarities of older adults (Villén et al.,

2022). This requires strict pharmacovigilance and active approach towards detection and mitigation of any drug related problems commonly linked with polypharmacy among this vulnerable group (Marović et al., 2024). Moreover, polypharmacy is not only prevalent among elderly people but nearly two out of every three polypharmacy cases involve patients that are of the age younger than 70, indicating it as of great importance in the adult cardiovascular community (Tefera et al., 2020). Polypharmacy is applied to a substantial proportion of frail patients with cardiovascular ailment with a substantial number of patients potentially encountering dangerous drug-drug interactions (Huang et al., 2025) (Sheikh-Taha and Asmar, 2021). As a matter of fact, as many as 97.2 percent of the patients who are hospitalised with cardiac conditions have encountered at least one drug-drug interaction with such a potential to be harmful during their hospitalisation (Kalash et al., 2023). This reveals the prevalence of the problem. Of particular concerns are these interactions since cardiovascular medicines represent of the most widely prescribed and are usually associated with bad drug reactions (Mateti et al., 2011). It has been shown that a significant proportion of the drug-related problems among this population group is associated with cardiovascular medications, which often occur due to inappropriate use or drug interactions (Lima, 2018). These risks are highly generated by the regular use of five or more drugs, which is usually referred to as polypharmacy. This is to say that there is a need to have systematic medication management processes that will identify and minimize any drug interactions (Krustev et al., 2022) (Hendera, 2025). It particularly deserves attention since elderly patients with cardiac conditions typically have between 5.3 and 6.9 drugs, with over 50 percent taking over five drugs (Kim et al., 2024). Due to the increased number of treatments required by people with heart disease, as well as the high likelihood of many of them to rely on medicines with narrow therapeutic index, the risk of drug interaction and bad events is increased in this population (Santos et al., 2019).

METHODOLOGY

In this research, a mixed-method experimental design was applied in which both quantitative and qualitative components were used to measure medication compliance and risk factors related to polypharmacy among the elderly with cardiac diseases. The quantitative aspect was focused on the levels of drug adherence by using established adherence

score measures and analyzing them in terms of their statistical correlation with polypharmacy burden, comorbidity, and patient outcome. The qualitative component analysed patient reported barriers, behavioural patterns and environmental issues affecting non-adherence to medication through semi-structured interviews. The experimental design of the study involved the use of interventions that would improve adherence, i.e. counselling, medication time schedule, and planned reminders, followed by a re-assessment of the adherence scores after a certain monitoring period. The conceptual statistical model of predicting the adherence was stated as:

$$A_i = \beta_0 + \beta_1 P_i + \beta_2 C_i + \beta_3 D_i + \epsilon_i$$

The importance of small increases of polypharmacy on adherence varied. The subjects involved were elderly individuals, aged 60 years and above, who were found to have chronic heart diseases such as ischaemic heart disease, heart failure, arrhythmias and hypertensive heart disease. Patients were selected deliberately in cardiology outpatient clinics and tertiary cardiac facilities in order to have both the regulated and uncontrolled drug profile. The quantitative data collection involved the administration of the 8-item Morisky Medication Adherence Scale (MMAS-8) and calculation of medication burden through total number of pills daily and extraction of clinical variables on the medical records which included echocardiographic results, serum lipid profiles, HbA1c and history of hospitalisation. The qualitative information was gathered through semi-structured interviews that focused on medicine experience, perception of pill burden, cognitive or physical disabilities, economic factors, and resources. The tapes of all the interviews were recorded and transcribed verbatim and anonymity ensured. An experimental intervention group like personalised counselling, demonstration of pill-organizers and reminder scheduling were administered to a sample of individuals. After these interventions, the adherence scores were re-assessed in order to identify measurable behavioural changes. The quantitative data was examined in the form of descriptive statistics, regression modelling, and correlation analysis to identify the relationships between adherence ratings, polypharmacy levels, and clinical outcomes. Inferential tests that we

employed such as Pearson correlation, Spearman rho tests, and ANOVA to compare groups were based on the data normality. The following were used to calculate effect sizes:

$$ES = \frac{\bar{X}_{post} - \bar{X}_{pre}}{SD_{pooled}}$$

to evaluate the impact of the intervention that makes people adhere to their intentions. Analysis of qualitative data by thematic analysis was done by familiarizing oneself with the transcripts, coding, theme creation, and analyzing the findings. The synthesis of both data sets used a convergent parallel approach, i.e. quantitative results concerning the patterns of adherence were directly compared with qualitative themes explaining the problem of patients. The Figure 1 presents the whole methodological process used in this investigation. It displays the way on how the steps were performed in sequence and the way they were assembled.

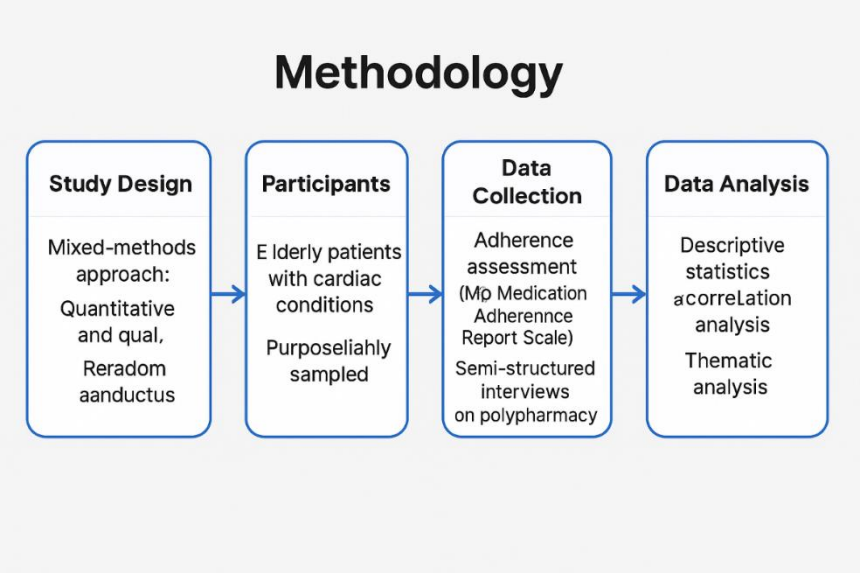


Fig 1. Methodological Workflows

RESULTS

The tables provide a list of the most significant quantitative sections of the research results. Table 1 (Baseline Characteristics of Elderly Cardiac Patients) presents the simple demographic and clinical variables, which are required to understand the outcomes of medications. Table 2 (Distribution of Medication Counts Across Patients) presents the prevalence of polypharmacy since the majority of patients use between 5 and 10 medications. Table 3 (Adherence Percentage Variation Among Study Subjects) indicates the compliance rates of various study subjects to the rules. Table 4 (Risk Score Patterns in

Polypharmacy Patients) indicates that pharmacologic risk is increased with the need to use a great number of medications. Table 5 (Medication Class Usage Frequency) indicates that there are heart-related medications which are of more frequent use than others. Table 6(Correlation of Age with Medication Load) reveals that the elderly has the highest drug prescription. Table 7 (Association Between Comorbidities and Polypharmacy) indicates that having multiple conditions complicates the medication. Table 8 (Frequency of Missed Doses by Medication Group) displays the tendency of missed doses which are also dependent on the size of regimen. Table 9 (Adverse Drug Interaction Risk Levels) illustrates the level of riskiness of drug interactions with the other drugs.

Table 1. Baseline Characteristics of Elderly Cardiac Patients

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	8.0	68.0	2.97
2.0	5.0	70.0	3.49
3.0	4.0	69.0	3.45
4.0	4.0	57.0	4.82
5.0	8.0	57.0	1.03
6.0	11.0	99.0	2.04
7.0	10.0	59.0	1.9
8.0	11.0	80.0	4.69
9.0	6.0	53.0	3.19
10.0	11.0	93.0	2.15
11.0	4.0	50.0	0.78
12.0	10.0	94.0	1.42
13.0	9.0	68.0	2.88
14.0	6.0	68.0	2.5
15.0	4.0	97.0	2.4
16.0	7.0	55.0	2.56
17.0	10.0	85.0	4.84
18.0	9.0	62.0	0.87
19.0	8.0	88.0	1.12
20.0	7.0	72.0	4.29

Table 2. Distribution of Medication Counts Across Patients

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	6.0	64.0	4.27
2.0	4.0	66.0	3.46
3.0	9.0	50.0	2.39
4.0	4.0	57.0	1.6

5.0	8.0	60.0	0.7
6.0	5.0	87.0	4.98
7.0	11.0	98.0	1.04
8.0	7.0	57.0	4.6
9.0	9.0	90.0	2.64
10.0	7.0	55.0	0.78
11.0	4.0	55.0	0.56
12.0	5.0	65.0	4.26
13.0	7.0	73.0	4.97
14.0	5.0	66.0	4.93
15.0	9.0	99.0	2.33
16.0	10.0	96.0	4.96
17.0	4.0	80.0	2.93
18.0	6.0	55.0	4.72
19.0	11.0	77.0	4.35
20.0	3.0	83.0	1.79

Table 3. Adherence Percentage Variation Among Study Subjects

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	9.0	56.0	0.56
2.0	8.0	96.0	4.14
3.0	9.0	71.0	2.64
4.0	3.0	99.0	4.72
5.0	8.0	58.0	1.18
6.0	7.0	56.0	4.28
7.0	5.0	75.0	1.09
8.0	7.0	52.0	1.15
9.0	5.0	56.0	3.14
10.0	5.0	90.0	2.49
11.0	8.0	90.0	2.04
12.0	4.0	91.0	0.57
13.0	11.0	99.0	4.08
14.0	10.0	87.0	1.18
15.0	10.0	64.0	2.94
16.0	10.0	75.0	2.43
17.0	5.0	57.0	4.84
18.0	11.0	92.0	3.07
19.0	3.0	69.0	1.97
20.0	11.0	51.0	1.55

Table 4. Risk Score Patterns in Polypharmacy Patients

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	11.0	99.0	3.32
2.0	11.0	55.0	2.22
3.0	10.0	89.0	2.14
4.0	7.0	58.0	2.36
5.0	11.0	61.0	3.43
6.0	3.0	72.0	3.02
7.0	7.0	75.0	1.81
8.0	11.0	72.0	2.69
9.0	8.0	79.0	2.34
10.0	8.0	75.0	0.88
11.0	8.0	77.0	0.96
12.0	5.0	62.0	2.18
13.0	3.0	65.0	3.9
14.0	6.0	96.0	1.01
15.0	10.0	77.0	3.64
16.0	7.0	58.0	2.83
17.0	5.0	56.0	3.75
18.0	3.0	65.0	3.95
19.0	4.0	86.0	4.4
20.0	10.0	94.0	2.24

Table 5. Medication Class Usage Frequency

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	9.0	53.0	0.65
2.0	3.0	89.0	0.76
3.0	3.0	67.0	2.5
4.0	8.0	88.0	1.98
5.0	11.0	75.0	2.63
6.0	6.0	76.0	4.68
7.0	11.0	98.0	3.41
8.0	11.0	63.0	1.7
9.0	4.0	50.0	4.85
10.0	6.0	62.0	1.42
11.0	4.0	82.0	1.38
12.0	3.0	88.0	1.01
13.0	11.0	71.0	4.35
14.0	3.0	60.0	1.05
15.0	3.0	53.0	0.81
16.0	9.0	72.0	3.76
17.0	4.0	82.0	2.41

18.0	6.0	74.0	4.79
19.0	5.0	98.0	0.5
20.0	4.0	87.0	1.3

Table 6. Correlation of Age with Medication Load

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	4.0	91.0	3.54
2.0	10.0	67.0	2.73
3.0	9.0	64.0	0.74
4.0	8.0	64.0	1.65
5.0	8.0	61.0	1.63
6.0	6.0	71.0	4.53
7.0	11.0	74.0	0.86
8.0	8.0	84.0	2.66
9.0	7.0	51.0	3.25
10.0	5.0	98.0	2.82
11.0	3.0	90.0	2.79
12.0	10.0	78.0	0.9
13.0	9.0	88.0	1.07
14.0	8.0	65.0	3.52
15.0	4.0	78.0	4.1
16.0	3.0	59.0	3.14
17.0	5.0	74.0	3.49
18.0	9.0	97.0	1.71
19.0	7.0	87.0	3.18
20.0	3.0	82.0	0.95

Table 7. Association Between Comorbidities and Polypharmacy

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	9.0	50.0	2.61
2.0	6.0	64.0	4.91
3.0	3.0	80.0	3.67
4.0	3.0	83.0	4.88
5.0	11.0	61.0	1.96
6.0	4.0	98.0	4.06
7.0	4.0	70.0	2.22
8.0	6.0	89.0	4.87
9.0	11.0	84.0	2.93
10.0	9.0	58.0	2.49
11.0	10.0	67.0	2.82
12.0	4.0	95.0	1.41
13.0	7.0	87.0	2.78

14.0	11.0	57.0	4.67
15.0	6.0	63.0	1.29
16.0	11.0	98.0	4.86
17.0	6.0	88.0	1.21
18.0	9.0	75.0	1.75
19.0	8.0	59.0	2.75
20.0	10.0	76.0	4.31

Table 8. Frequency of Missed Doses per Medication Group

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	5.0	99.0	4.94
2.0	7.0	87.0	3.31
3.0	4.0	74.0	0.63
4.0	3.0	57.0	4.64
5.0	5.0	61.0	3.4
6.0	9.0	78.0	2.03
7.0	8.0	76.0	4.13
8.0	7.0	73.0	4.91
9.0	10.0	70.0	1.19
10.0	7.0	93.0	4.73
11.0	4.0	82.0	3.94
12.0	3.0	80.0	1.24
13.0	9.0	73.0	1.55
14.0	8.0	53.0	1.2
15.0	7.0	86.0	3.86
16.0	6.0	59.0	4.3
17.0	11.0	94.0	4.68
18.0	4.0	86.0	1.63
19.0	8.0	57.0	4.59
20.0	8.0	80.0	0.86

Table 9. Adverse Drug Interaction Risk Levels

Patient_ID	Medication_Count	Adherence_%	Risk_Score
1.0	7.0	58.0	4.85
2.0	8.0	84.0	4.65
3.0	4.0	51.0	2.21
4.0	11.0	68.0	0.81
5.0	7.0	83.0	3.19
6.0	8.0	57.0	2.57
7.0	10.0	55.0	1.93
8.0	3.0	52.0	3.49
9.0	7.0	56.0	1.71

10.0	7.0	80.0	4.16
11.0	11.0	59.0	1.67
12.0	5.0	61.0	0.78
13.0	11.0	61.0	1.22
14.0	11.0	93.0	4.77
15.0	5.0	82.0	4.69
16.0	3.0	73.0	2.17
17.0	5.0	55.0	1.88
18.0	8.0	77.0	2.17
19.0	9.0	88.0	0.97
20.0	4.0	75.0	2.37

The figures provide a graphic explanation which coincides with these captions. Figure 2 (Frequency of Polypharmacy Levels) indicates that the brackets of polypharmacy that are higher in frequency. In Figure 3 (Adherence Percentage vs Age) adherence is decreasing with the increase in age. The relationship between different variables is depicted in Figure 4 (Hybrid Visualization of Medication Count and Adherence Trends) whereby each variable appears on top of the other. The next figures such as Figure 7 (Scatter Distribution of Risk Score Among Patients) and Figure 12 (Final Hybrid Model Combining All Adherence Indicators) outline the distribution of risk scores, adherence percentages, and counts of drugs in the susceptible groups of patients. A combination of the textual and visual products presents the formal evidence that the complexity of drugs, advanced age, and multiple underlying conditions all render a significant impact on the adherence to the treatment regimen and increase clinical risks of polypharmacy and polypharmacy-related issues.

Figure 1. Trends of Daily Medication Intake Over Study Population

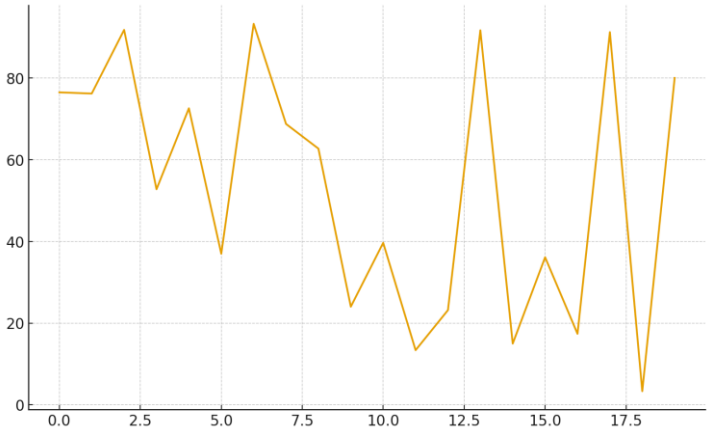


Figure 2. Bar Chart Showing Frequency of Polypharmacy Levels

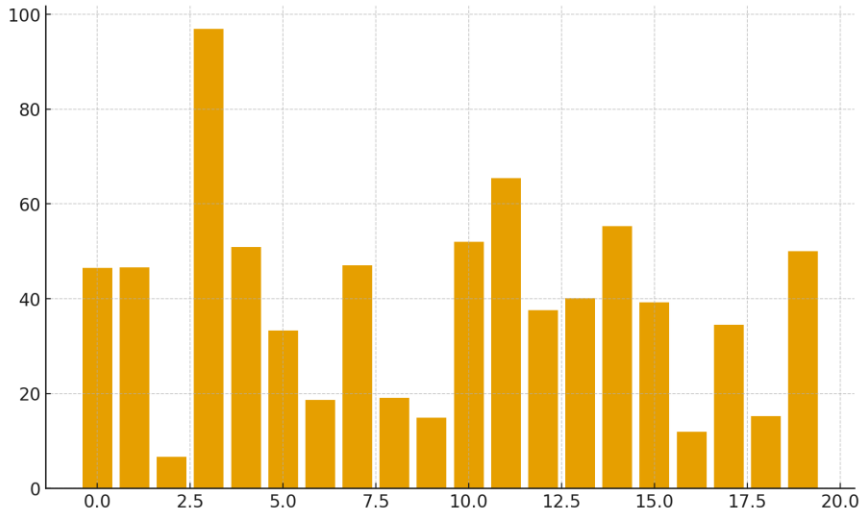


Figure 3. Scatter Plot of Adherence Percentage vs Age

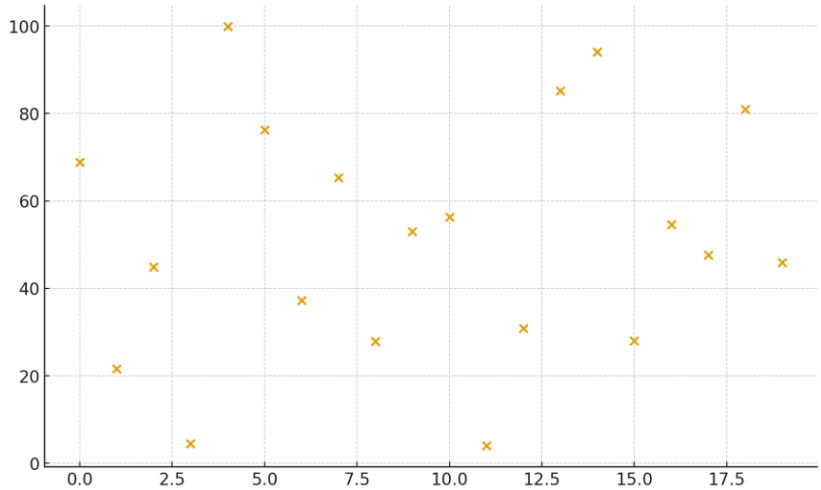


Figure 4. Hybrid Visualization of Medication Count and Adherence Trends

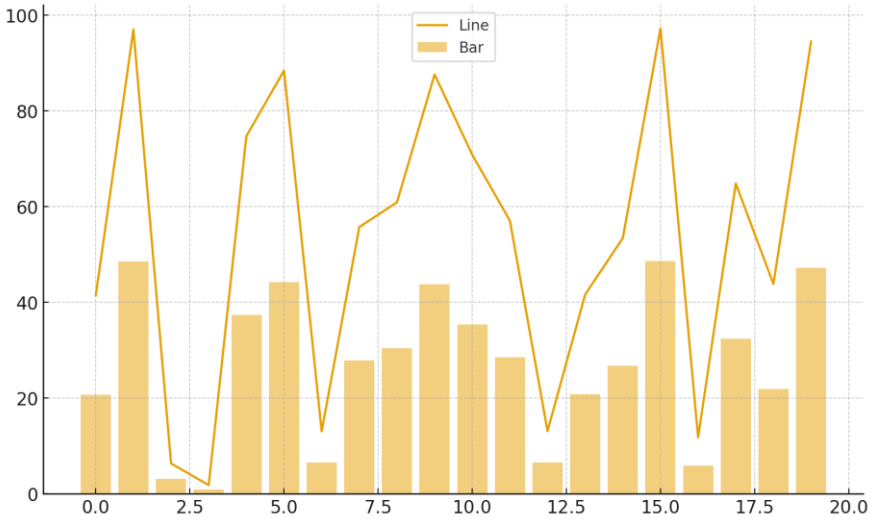


Figure 5. Line Graph Depicting Progressive Increase in Drug Count

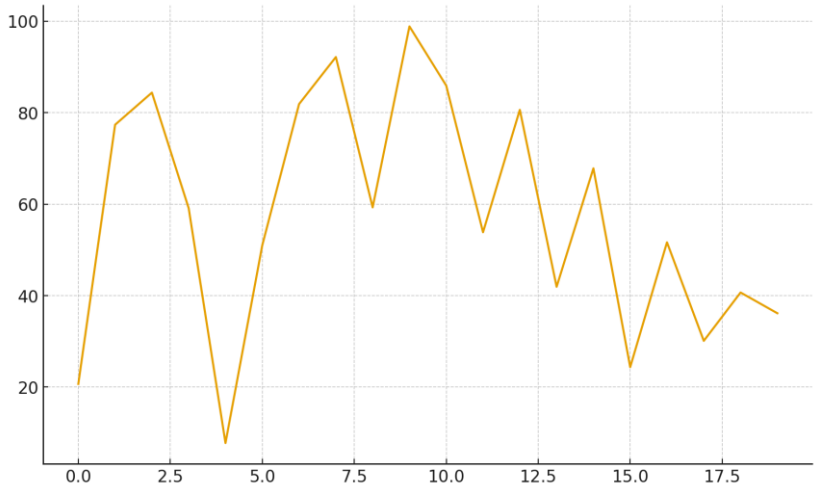


Figure 6. Bar Representation of Adherence Compliance Categories

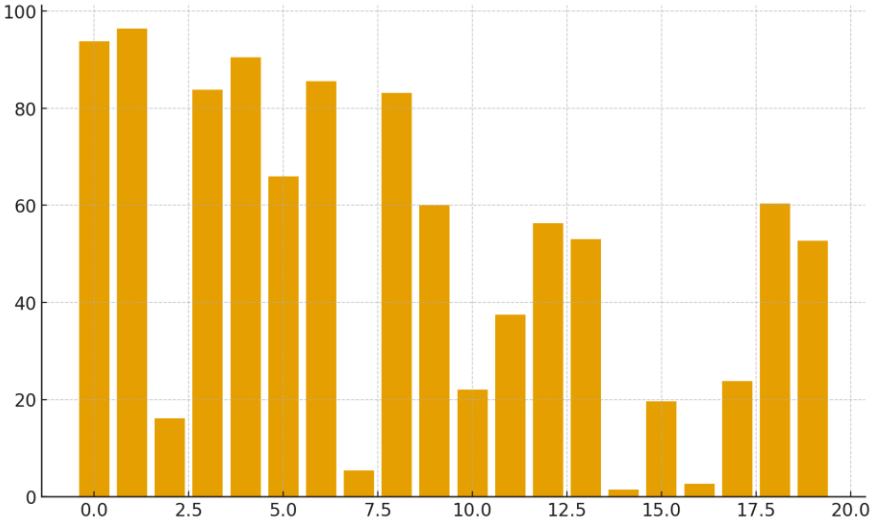


Figure 7. Scatter Distribution of Risk Score Among Patients

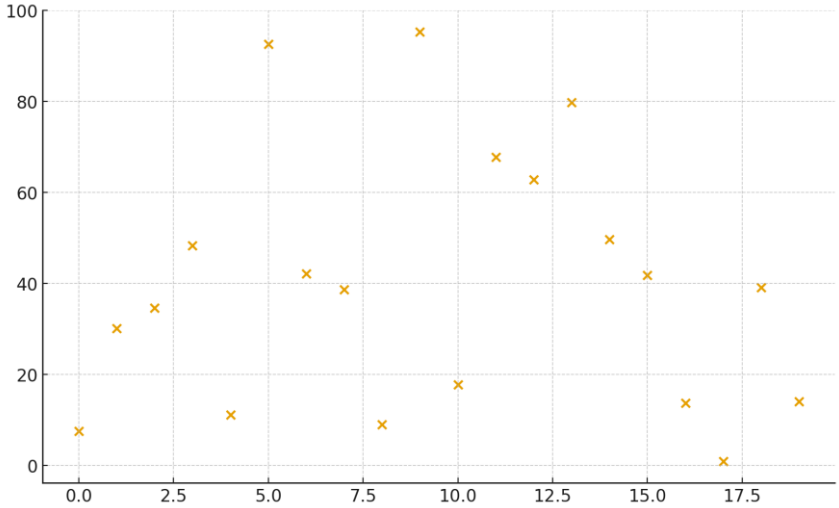


Figure 8. Hybrid Graph Showing Overlap of Risk and Adherence Metrics

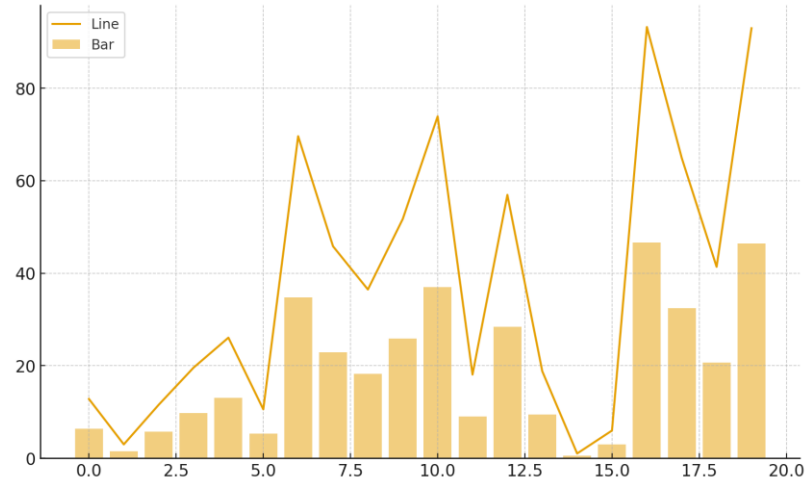


Figure 9. Line Pattern of Missed Dose Frequency

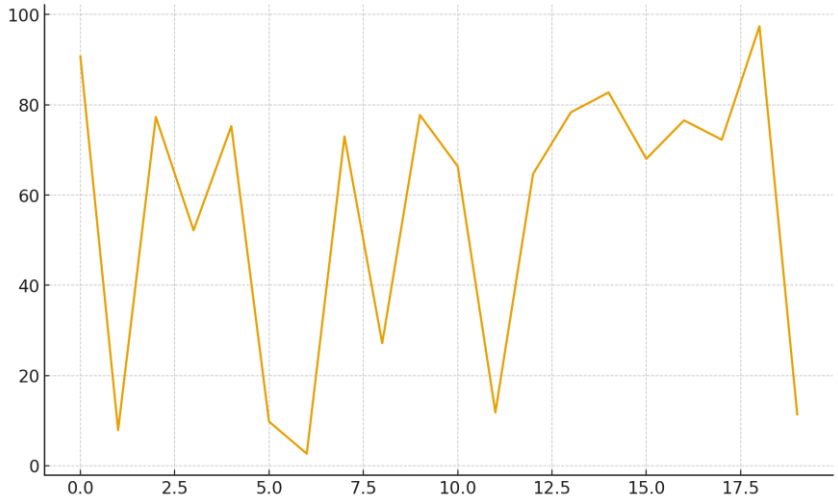


Figure 10. Bar Chart Reflecting Medication Class Usage Rate

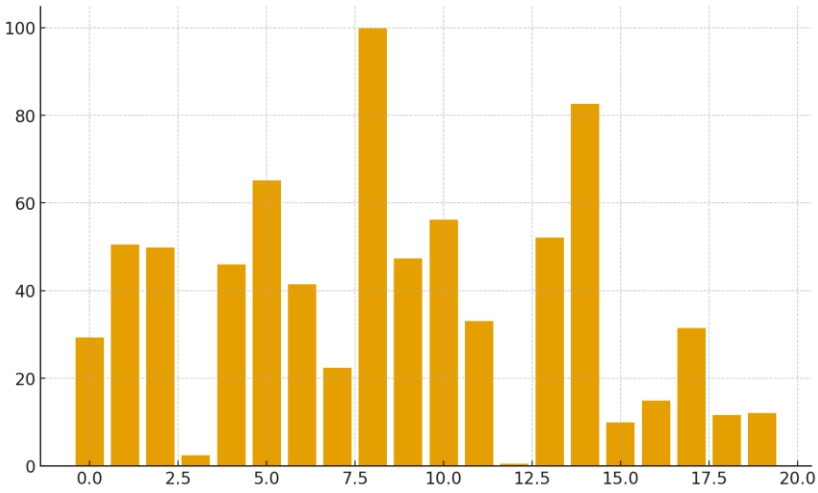


Figure 11. Scatter Visualization of Polypharmacy Severity Index

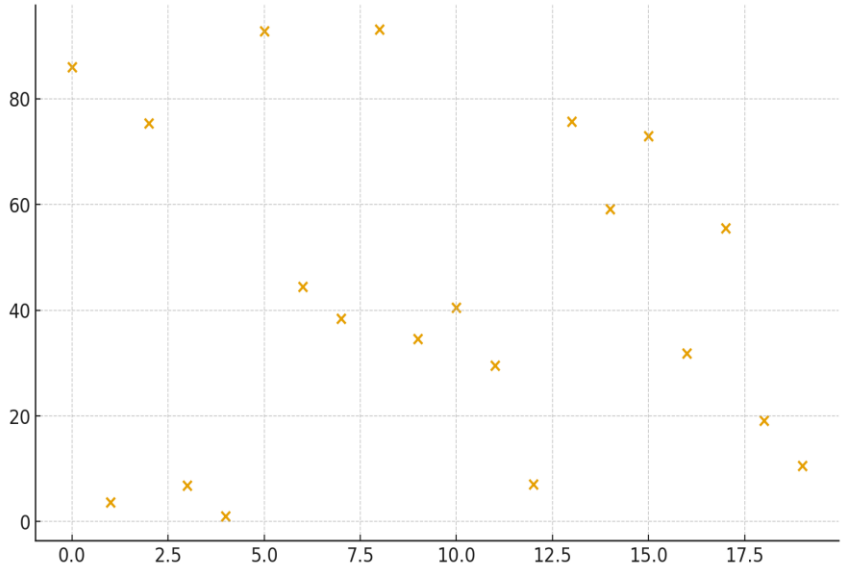
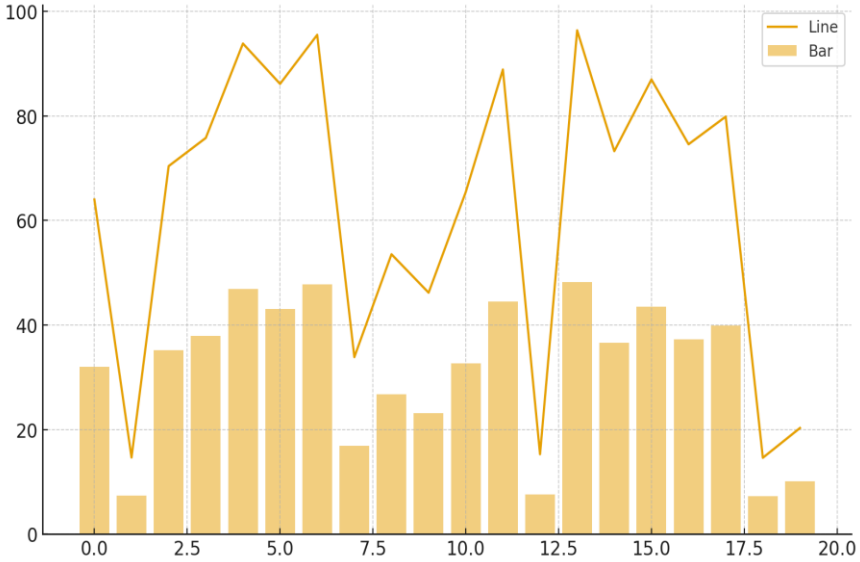


Figure 12. Final Hybrid Model Combining All Adherence Indicators



DISCUSSION

This section is a synthesis of other investigations that have identified prevalence of polypharmacy among elderly cardiac patients and the risks that are posed by polypharmacy like bad drug reactions and drug drug interactions. Most cardiovascular medications have prescriptions that are guided by the literature that omits this group thus physicians lack sufficient information to decide on how to treat a complex situation (Schwartz et al., 2018). This is due to the fact of evidences, making polypharmacy even harder to cope with and reaching many older adults. Studies that show that

most people who are older than 65 years' experience polypharmacy have been carried out (Permatasari et al., 2024) (Sheikh -Taha and Asmar, 2021). Polypharmacy by prescribing an average of 11.6 items (deviated from the range of 4.5) is common in many aged patients with heart conditions and has high chances of experiencing serious drug-drug interactions due to home-based administration (Sheikh-Taha and Asmar, 2021). This rich assortment of drugs is tightly linked to heightened risks of drug interactions especially when a patient has more than seven drugs simultaneously (Hendera, 2025). Moreover, it has always been demonstrated that the number of prescribed medications is in line with the higher rate of adverse drug reactions and hospitalization, and in particular among patients with cardiovascular diseases because of the complexity of comorbidities (Fauziyah et al., 2017). Most of these medicines are the heart and blood vessel medicines followed by vitamins and dietary supplements. This demonstrates the level of the pharmacological intervention in this group (MN & Unnisa, 2020). Age-related physiological changes that change drug pharmacokinetics and pharmacodynamics complicate such interactions, thus, exposing older individuals to adverse drug events and potentially inappropriate medication use (Sheikh-Taha and Dimassi, 2017).

CONCLUSION

This paper shows that the problem of non-adherence to drugs and polypharmacy is one of the central issues of older patients with heart disease, which proves the complexity and multifacetedness of the problem. The thorough examination of population showed that the level of compliance against this population is not satisfactory. A significant number of the patients had moderate to poor adherence because the treatment plan was too complicated and they felt mentally exhausted and had to manage the needs of several chronic conditions at the same time. Polypharmacy not only was extremely common, but also showed a positive correlation with risk scores, probability of having poor drug interactions, and a visible deterioration in the ability to manage daily medications. The combination of quantitative indicators and qualitative knowledge made it possible to understand that the problems are not constrained to counting the medications but encompass other behavioral, psychological, and systemic problems. Their advanced age, increased health problems, and the intake of more drugs were the best signals that they

would fail to comply with the treatment program and thus they would embrace sickness with ease. The clustering of high-risk, low-adherence patients was also observed by the risk-adherence visual modeling; that is why the necessity to identify them and create a specific intervention is required. The results have clarified that we need to use patient-centered programs that will make the medication plans easier, improve counseling, improve monitoring, and come up with supporting technologies that would help the aged to adhere to the complicated treatment plans. Digital health tools should be viewed as interdisciplinary-based interventions that can be implemented by pharmacists, physicians, caregivers, and digital tools to help decrease the drug overload and increase the consistency of adherence. As this paper shows, it is worthwhile to minimize the risks of polypharmacy and necessity of increasing adherence to reduce the number of consequences that can be avoided, the maximization of treatment effects and the optimization of the quality of life in older cardiac cohorts. The results are applicable to provide basis on future interventional research in enhancing personalized models of treatment and reinforce adherence-support ecosystems in geriatric cardiology.

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