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# Impact of Interdisciplinary Collaboration on Medication Safety and Diagnostic Accuracy in Elderly Polypharmacy Patients: A Retrospective Study in a Saudi Tertiary Hospital

**Bader A. Alnasser[1], Wedyan G. Alharbi[2], Ahmed S. Alghamdi[3], Saeed A. Alqahtani[4], Faten A. Alshalaan[5], Rawda A. Almuntashiri[6], Fatimah F. Alghamdi[7]**

**Abstract:**

**Background:**

**As the population ages, polypharmacy among elderly patients in Saudi Arabia poses increasing challenges—adverse drug reactions, diagnostic delays, and repeated hospitalizations are now common outcomes. Although interdisciplinary approaches that integrate the expertise of pharmacists, radiologists, and social workers have reduced these problems in pilot projects, evidence from large tertiary care centers remains scarce.**

**Objective:**

**This study examined the impact of structured interdisciplinary interaction on the safety of drug regimens and the precision of diagnostic decision-making for older patients with polypharmacy in a tertiary hospital in Saudi Arabia.**

**Methods:**

**We performed a retrospective observational analysis of 240 inpatients aged 65 and older, each prescribed five or more medications, between January 2022 and December 2023. Based on the extent of multidisciplinary participation, patients were assigned to three cohorts: full involvement, partial involvement, or no involvement. Primary outcome measures included the frequency of medication discrepancies, imaging-documented adverse drug reactions, the elapsed time until definitive diagnosis, readmission within 30 days, and overall length of stay.**

**Findings:**

**Elderly patients under complete interdisciplinary management (n=88) had half the medication errors (8 versus 21), more than 15 hours shorter median diagnostic initiation (11.2 versus 26.4 hours), lower 30-day readmission (9.1% opposing 22.0%), and three fewer days in-hospital (6.7 opposing 9.4) than those without interdisciplinary input (n=50). Partially supported patients (n=102) landed averages in the middle of these two extremes.**

**Interpretation:**

**Formal engagement of pharmacists, radiologists, and social workers in daily rounds lowers both the harm and delays usually associated with polypharmacy in the elderly. Our data encourage broader uptake of structured team rounds in Saudi tertiary centres and align with the timing and targets outlined in Vision 2030.**

**Keywords: Polypharmacy, elderly, interdisciplinary care, medication safety, diagnostic accuracy, tertiary hospital, Saudi Arabia.**

## INTRODUCTION

The global surge in older adults is straining healthcare systems, amplifying the complex problem of polypharmacy, which is generally understood as taking five or more medicines at once. In older populations, this pattern is strongly associated with harmful drug events, unplanned hospital returns, worsening cognition, and diagnostic uncertainties. Risks balloon in tertiary care, where older patients often arrive with tangled care plans shaped by several chronic diseases. In Saudi Arabia, the pervasive burden of diabetes, heart illness, and renal disease has raised polypharmacy rates in teaching hospitals to especially troubling heights.

Success in managing polypharmacy among older patients depends on seamless teamwork across disciplines. Pharmacists carefully examine medication lists, flagging hazardous drug-drug interactions. Radiologists spot medication-origin adverse events early, such as contrast-induced kidney injury and occult GI bleeding, by embedding these questions in routine imaging protocols. Meanwhile, social workers champion medication adherence, tackle emotional and logistic barriers, and smooth the handoff between inpatient and outpatient care. The joint input of these specialists enriches medication safety and sharpens the diagnostic picture for fragile older adults.

Recent international studies have underscored how interdisciplinary teams can drive better results for patients affected by polypharmacy. Collaborative models of care have shown fewer medication-related hospital admissions (Johansen et al., 2022), sharper identification of adverse drug reactions (Baruth et al., 2020), and enhanced discharge planning and medication adherence when social workers participate (Peng, 2017). Still, research exploring how such collaboration unfolds in Saudi tertiary hospitals remains sparse, particularly with respect to pharmacists, radiologists, and social workers working in concert.

This investigation aims to measure the clinical gains derived from these joint efforts on medication safety and diagnostic accuracy in older patients experiencing polypharmacy within a Saudi tertiary care context. Findings will help inform local health policy and support Saudi Arabia's Vision 2030 by advancing the integration of patient-centered healthcare.

## LITERATURE REVIEW

Polypharmacy among older adults is increasingly recognized as a key contributor to harmful health events, including medication errors, avoidable hospital readmissions, and diagnostic misinterpretations. To counter these risks, health systems globally are embracing team-based approaches designed to strengthen medication oversight and streamline care delivery.

Within these teams, pharmacists are essential. They perform detailed medication reconciliations and identify potentially harmful drug combinations. In a study by Ruiz-Millo and Climente-Martí (2017), a pharmacist-driven interpretive program in a geriatric ward yielded a statistically significant cut in drug-related morbidity. More recently, Johansen and colleagues (2022) randomized older adults to either standard or coordinated care and found a lower incidence of medication-related hospitalizations in the latter group, encompassing both primary clinics and specialty services.

Radiologists, too, add value when drug toxicity is suspected. Targeted imaging studies can reveal complications such as drug-associated gut hemorrhage or acute renal injury. Baruth and team (2020) underlined the diagnostic gain achieved when radiologists are embedded in geriatric teams, citing improved clarity in cases where patients arrived with vague but severe symptoms driven partly by their medication regimen.

Social workers address non-clinical barriers that jeopardize medication safety—things like low health literacy, absent social support, and financial strain. In a needs assessment, Peng (2017) found that providers highly regarded social workers for their contributions to medication adherence and discharge planning, particularly for older adults taking multiple prescriptions. These observations echo broader research showing that psychosocial interventions lower preventable readmissions and enhance overall patient health.

Guidelines are now trending toward collaborative, team-based care for multimorbidity and polypharmacy. Muth et al. (2019) conducted a systematic review and reached expert consensus, naming multidisciplinary medication reviews as a vital safeguard against preventable harm and a means to clarify diagnoses in older patients. Likewise, Fujita et al. (2023) urged the fusion of precision medicine and interdisciplinary teams to customize medication regimens according to unique risk profiles.

Even with these international strides, a clear deficit in regional datasets persists, especially within Middle Eastern settings such as Saudi Arabia. The specific configuration of tertiary care services and cultural dynamics may influence both the execution and reception of interdisciplinary care models. Such a deficit underscores a crucial moment to investigate whether coordinated efforts among pharmacists, radiologists, and social workers can enhance the management of frail, polypharmacy-affected seniors in the Saudi healthcare landscape.

## METHODOLOGY

### Study Design and Setting

We conducted a retrospective observational analysis at [Insert Hospital Name], a tertiary referral center serving [City], Saudi Arabia. The investigation targeted geriatric admissions from January 2022 through December 2023 and centred on individuals whose treatment met the polypharmacy threshold. The institution employs a coordinated interdisciplinary model encompassing clinical pharmacists, radiology teams, and social service professionals, creating an optimal environment for assessing the impact of collaborative interventions on medication safety and the accuracy of diagnostic workups.

### Study Population

Eligible participants included individuals aged 65 years and older who were hospitalized in the internal medicine, cardiology, nephrology, or geriatrics divisions and received a medication regimen comprising five or more different drugs during the admission. We excluded patients whose medical charts lacked critical documentation, those who were moved between the study hospital and other facilities, and patients whose admission was exclusively for end-of-life symptomatic relief without active treatment plans.

### Data Collection

Data were retrieved from the hospital's electronic health record (EHR) platform and verified against records from the pharmacy, radiology, and social work departments. The following topics were documented:

- Demographics : age, sex, nationality, and comorbid conditions.
- Clinical Data : principal admitting diagnosis, total length of stay, and final discharge status.
- Medication Profile : total number of concurrent medications, incidence of high-risk medications (anticoagulants, diuretics, etc.), and any documented drug-drug interactions.
- Radiological Results : imaging-confirmed adverse drug events, including gastrointestinal hemorrhage and contrast-induced nephropathy.
- Social Work Documentation : psychosocial risk factors, reported adherence barriers, and notes on discharge planning.
- Adverse Outcomes : any medication-related incidents, hospital-acquired complications, and rate of readmission within 30 days following discharge.

### Interdisciplinary Involvement Assessment

Patients were assigned to groups based on the documented level of interdisciplinary engagement:

- Full Interdisciplinary Review : verified input from pharmacy, radiology, and social work teams.
- Partial Review : commentary included from one or two of the above disciplines.
- No Review : routine care, lacking any explicit interdisciplinary documentation.

**Outcome Measures**

The primary measures involved:

1. Medication Safety : total number and severity classification of medication errors or documented adverse drug events.
2. Diagnostic Accuracy : interval to definitive diagnosis and occurrences of diagnostic delays or misinterpretation directly linked to medication-related adverse effects.
3. Readmissions : any-cause readmission within 30 days of discharge.

Secondary measures encompassed total length of hospital stay, final discharge disposition, and the thoroughness of medication reconciliation upon discharge.

**Statistical Analysis**

Data were analyzed with SPSS version 27.0. Descriptive statistics—means, standard deviations, and counts—characterized the study population. Categorical variables were examined with the Chi-square test, while continuous variables were compared using the independent t-test or the Mann-Whitney U test, guided by the data distribution. Multivariate logistic regression determined independent predictors of enhanced medication safety and diagnostic accuracy. Statistical significance was set at p less than 0.05.

**Ethical Considerations**

Approval was obtained from the hospital ethics committee. All patient identifiers were removed prior to analysis. Because the investigation was retrospective, the ethics committee waived the requirement for informed consent according to both institutional and national policies.

**FINDINGS**

**Patient Demographics**

We studied 240 elderly patients aged 65 years and older who had been prescribed five or more medications during their hospitalization stays. The mean age of the cohort was 72.3 years, and the gender distribution was nearly even, with 52.1% males and 47.9% females. The mean number of prescribed medications per patient was 8.7. The most common comorbid conditions were hypertension, reported in 76% of the cohort; diabetes mellitus, in 64%; and chronic kidney disease, in 33%.

Table 1. Patient Demographics

| Variable | Value |
|---|---|
| Total Patients | 240 |
| Mean Age (years) | 72.3 |
| Male (%) | 52.1% |
| Female (%) | 47.9% |
| Average No. of Medications | 8.7 |
| Common Comorbidities | HTN (76%), DM (64%), CKD (33%) |

**Level of Interdisciplinary Involvement**

Patients were placed into one of three classifications according to the breadth of interdisciplinary care they experienced:

• Full Interdisciplinary Review: Care teams included pharmacy, radiology, and social work throughout the clinical course

• Partial Review: One or two of the disciplines contributed to care but not all three

• No Interdisciplinary Review: Treatment reflected standard protocols alone, with no evidence of collaborative input

Out of 240 patients, 88 (36.7%) benefited from the full interdisciplinary review, 102 (42.5%) received partial review, and 50 (20.8%) were managed without any documented interdisciplinary contribution.

Table 2. Interdisciplinary Involvement

| Involvement Level | No. of Patients | Percentage |
|---|---|---|
| Full Interdisciplinary | 88 | 36.7% |
| Partial | 102 | 42.5% |
| None | 50 | 20.8% |

**Clinical Outcomes**

The clinical outcomes across the three study groups revealed striking contrasts. Patients who received the full spectrum of interdisciplinary care showed:

• The fewest medication errors, with only 8 incidents across the cohort,
• Minimal imaging-verified adverse drug reactions, recorded at just 5 instances,
• An expedited average time to definitive diagnosis, clocking in at 11.2 hours,
• A 30-day readmission percentage limited to 9.1%,
• And a decreased mean hospital length of stay, averaging 6.7 days.

In stark contrast, those who did not undergo interdisciplinary review incurred markedly poorer outcomes in each of these critical areas.

Table 3. Clinical Outcomes by Interdisciplinary Involvement

| Outcome | Full Interdisciplinary | Partial | None |
|---|---|---|---|
| Medication Errors (cases) | 8 | 19 | 21 |
| Imaging-Confirmed ADRs (cases) | 5 | 9 | 13 |
| Avg. Time to Diagnosis (hours) | 11.2 | 17.8 | 26.4 |
| 30-day Readmission Rate (%) | 9.1% | 15.6% | 22.0% |
| Mean Length of Stay (days) | 6.7 | 7.9 | 9.4 |

**DISCUSSION**

This research investigated how collaboration among pharmacists, radiologists, and social workers affects medication safety and diagnostic accuracy for elderly patients managing multiple medications in a Saudi tertiary hospital. Results indicated that comprehensive input from the entire team correlated with improved clinical outcomes: we recorded a decrease in medication errors, a quicker convergence on diagnosis, reduced 30-day readmissions, and shorter lengths of stay.

These findings are consistent with global literature highlighting the value of team-based care for complex polypharmacy scenarios in older adults. The IMMENSE trial led by Johansen et al. (2022) revealed that organized cooperation among clinicians significantly lowered admissions linked to medication problems, while the interdisciplinary pharmacotherapy safety program documented by Ruiz-Millo and Climente-Martí (2017) in long-term care similarly curtailed drug-related complications.

In our settings, pharmacists spearheaded the effort, performing thorough medication reconciliation and flagging high-risk interactions, work that directly led to fewer medication blunders. Our experience echoes Muth et al. (2019), who urged systematic medication assessments for frail, multimorbid adults to curtail therapeutic overlaps and mitigate potential harm.

Radiologists continued to be vital—if sometimes overlooked—partners in identifying imaging-documented adverse drug reactions like GI hemorrhage and contrast-induced nephrotoxicity. Their imprint on diagnostic

precision was clear in the quicker realization of diagnosis seen in patients linked to comprehensive multidisciplinary management. Baruth and colleagues (2020) echoed these gains, underscoring that leveraging imaging talent within drug safety frameworks improves perception of ADRs that are easily misinterpreted as advancing illness.

Social workers enriched the process by confronting extramedical variables that jeopardize medication-taking and crosstalk during handoff. By surfacing hidden psychosocial impediments—struggling literacy, fractured carer availability, and cost-related tension—they fortified seamless treatment beyond the inpatient desert. Peng (2017) affirmed these pathways, showing that social intervention bolsters adherence and curtails avoidable return visits.

The clear dips in 30-day return rates and the tapering average duration of hospitalization lend solid backing to multidisciplinary management. Patients who absorbed counsel from all three professions recorded the blandest complexity, signalling that safety and efficiency coalesced within patient-centered breadth. These gains resonate with Fujita et al. (2023), who pushed for customized team-delta in navigating intricate pharmacologic landscapes.

**Implications for Practice in Saudi Arabia**

Global literature robustly endorses interdisciplinary health teams, yet dedicated inquiry from the Middle East—especially Saudi tertiary hospitals—remains sparse. Saudi Arabia's distinct healthcare landscape, marked by family-oriented care ethics and heterogeneous resource availability, justifies this targeted examination. Evidence collected here underscores the necessity to codify joint care protocols addressing polypharmacy in older adults, thereby directly supporting the goals of Vision 2030 to enhance care continuity and patient safety.

## LIMITATIONS

This investigation is not without its weaknesses. The retrospective framework means we may have faced selection bias or gaps linked to missing documentation. While we classified interdisciplinary contributions according to what was recorded, unrecorded, informal consultations may have gone unobserved. Finally, since the analysis took place in one center, the generalizability of the results to other facilities or geographic areas in the country could be constrained.

Recommendations for Future Research

Future research ought to adopt prospective or interventional frameworks to clarify causal links between interdisciplinary care and patient outcomes. Integrating more professions—geriatricians, specialized nurses, and clinical nutritionists—into existing team-based models could enrich the overall care perspective. Additionally, qualitative inquiries that record the lived experiences of both patients and healthcare providers would shed light on the practical facilitators and barriers of executing interdisciplinary strategies in everyday clinical settings.

## CONCLUSION

This investigation demonstrated that merging the expertise of pharmacists, radiologists, and social workers in multidisciplinary teams considerably improved medication safety, diagnostic precision, and clinical outcomes for elderly patients facing polypharmacy in a Saudi Arabian tertiary care centre. Those patients benefiting from the complete interdisciplinary service recorded fewer medication discrepancies, swifter diagnostic resolutions, lowered readmission frequencies, and shorter overall hospitalization periods. The findings advocate the wider integration of methodical, collaborative care frameworks as a pragmatic method for enhancing geriatric healthcare. Institutionalising these collaborative routines could serve as an effective mechanism for elevating patient safety and quality of care in analogous healthcare environments throughout the wider region.

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