Investigating The Epidemiology of Medication Errors in Adults in Community Care Settings. A Retrospective Cohort Study in Central Saudi Arabia

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Introduction
Patient safety is a public concern in healthcare systems across the world.(1) Medication errors are a major problem across care settings, including home, ambulatory, and primary care (henceforth community) settings.(1) The World Health Organization has identified medication errors as key focus areas for the enhancement of patient safety in community settings.(2)

Objectives
To investigate the period prevalence of and risk factors for clinically important prescribing and monitoring errors among adults managed in one Family Medicine in Riyadh, SA and to compare the QRESEARCH analysis of secular trends in the United Kingdom (UK) with the estimates we obtained in SA.(3)

Methods
The research protocol, data collection sheet, and waiver of informed consent were approved by the Clinical Research Committee and the Research Ethics Committee.

A phased approach was undertaken beginning with feasibility and pilot work; followed by a retrospective cohort study using electronic health record (EHR) derived data. A random sample of 2,000 adults (218 years old) visiting one Family Medicine was selected. Data collection took three months (01 October to 31 December 2017). Manual data extraction was performed for all records, while a second trained reviewer undertook the independent assessment of a random 10% of the sample of records.

Inclusion criteria
1. Saudi and non-Saudi aged 18 years or over.
2. Patients recorded to be receiving at least one prescribed/Over-the-Counter (OTC) medication. These medications were checked against the SFDA list of human medications and were subsequently classified into prescription or OTC medications.(4)
3. Patients who had been registered with Family Medicine for at least 15 months prior to data extraction.

Descriptive analyses and logistic regression modelling were performed using STATA (version 14) statistical software.

Results
The agreement between the two independent data extractors was substantial (Kappa 0.8).

Medication errors
The overall period prevalence of patients with at least one medication error over 15 months is 5.85% (95% confidence interval [CI] 4.8 to 6.9) and the overall period prevalence of medication errors over 15 months is 8.1% (95% CI 6.5-9.7).

Risk factors
Risk factors that significantly predicted the overall patients at risk of experiencing medication errors were:

Medication-related
1. Patients aged ≥ 65 years (OR 27.2; 95% CI 18.6 to 39.85)
2. Male gender (OR 1.9; 95% CI 1.5 to 2.25)
3. Saudi nationality patients (OR 2.7; 95% CI 2.2 to 3.3)
4. Patients taking five or more drugs (polypharmacy) (OR 4.7; 95% CI 3.8 to 5.8).

Physician-related
1. Physician's male gender (OR 1.6; 95% CI 1.3 to 2.1)
2. Saudi nationality physicians (OR 1.9; 95% CI 1.5 to 2.5).

The overall period prevalence of the first 12 clinically important errors in medicine management was 5.4% (95% CI 2.2-4.6) in this research, compared to the 0.9% in QRESEARCH analysis of secular trends estimates.

Conclusions
This is the first study to investigate medication errors in community settings in SA. Clinically important medication errors were commonly replicated in relation to both drug prescribing and monitoring. Future research should replicate this work in different community contexts in SA and other countries, in order to investigate in greater depth the error-related adverse events and develop and evaluate interventions to decrease clinically important errors in medicine management.

References

Table 1: Cohort study proportion of errors in patients at risk of each outcome measure.

<table>
<thead>
<tr>
<th>Medication errors</th>
<th>Physician-related</th>
<th>Composite secondary outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patients with a history of pre-existing conditions who have been prescribed a medication (N=50)</td>
<td>1.1</td>
<td>1.1</td>
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<tr>
<td>1. Patients diagnosed with diabetes who have been prescribed an ACE inhibitor in a long-term patient (N=25)</td>
<td>1.5</td>
<td>1.5</td>
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<tr>
<td>1. Patients aged ≥ 65 years (N=25)</td>
<td>2.7</td>
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<tr>
<td>1. Male gender (N=25)</td>
<td>3.3</td>
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<tr>
<td>1. Saudi nationality patients (N=25)</td>
<td>4.1</td>
<td>4.1</td>
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<tr>
<td>1. Patients taking five or more drugs (polypharmacy) (N=25)</td>
<td>6.9</td>
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Not calculable.