

Quantifying problematic prescribing cascades in the Netherlands

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Background

Prescribing cascade: the misinterpretation of an adverse drug reaction (ADR) from one medication (index) as a medical condition, which is subsequently treated with another medication (marker) [1,2].

Problematic prescribing cascade: when the benefits of this combination of medication (index and marker) do not outweigh the risks on the patient's health [3].

Aim

Overall aim: to assess the occurrence of problematic prescribing cascades in The Netherlands.

Specific aims:

- To provide an overview of prescribing cascades from literature.
- To assess which prescribing cascades are problematic.
- To quantify the problematic prescribing cascades using dispensing data from a national database (Ncontrol).

Method

A mixed-methods study was conducted.

Qualitative part: literature review and assessment by 16 experts (pharmacists and physicians in primary and secondary care).

Quantitative part: retrospective cohort study using Prescription Sequence Symmetry Analysis (PSSA) method to quantify prescribing cascades. Data were extracted from over 650 community pharmacies from 2015 until 2020.

Data-analysis

- The PSSA method evaluates the ratio between patients receiving the marker medication after the index medication and patients receiving the marker medication before the index medication (Figure 1).
- The crude sequence ratio (cSR) is adjusted for prescribing trends and results in an adjusted sequence ratio (aSR).
- An aSR ≥ 1 indicates an increased probability that an index medication is followed by a marker medication and indicates the occurrence of a prescribing cascade
- Data were analysed using SPSS version 27.

$$cSR = \frac{\text{patients where index} \rightarrow \text{marker medication}}{\text{patients where marker} \rightarrow \text{index medication}}$$

Figure 1. Equation for the crude sequence ratio (cSR).

References

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2. Rochon PA, Gurwitz JH. Optimising drug treatment for elderly people: the prescribing cascade. Bmj. 1997;315(7115):1096-9.
3. McCarthy LM, Visentin JD, Rochon PA. Assessing the Scope and Appropriateness of Prescribing Cascades. J Am Geriatr Soc. 2019;67(5):1023-6.
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Results

Qualitative part: 90 prescribing cascades were identified from literature and 58 were assessed as problematic. These mostly concerned antidepressants, antipsychotics and lipid modifying agents as index medication. Depression, erectile dysfunction and urinary incontinence were the most frequently occurring ADRs.

Quantitative part: A significant aSR was found for 37 (63%) of 58 prescribing cascades. For 16 prescribing cascades the aSR was between 1-1.5 and for 21 the aSR was >1.5 .

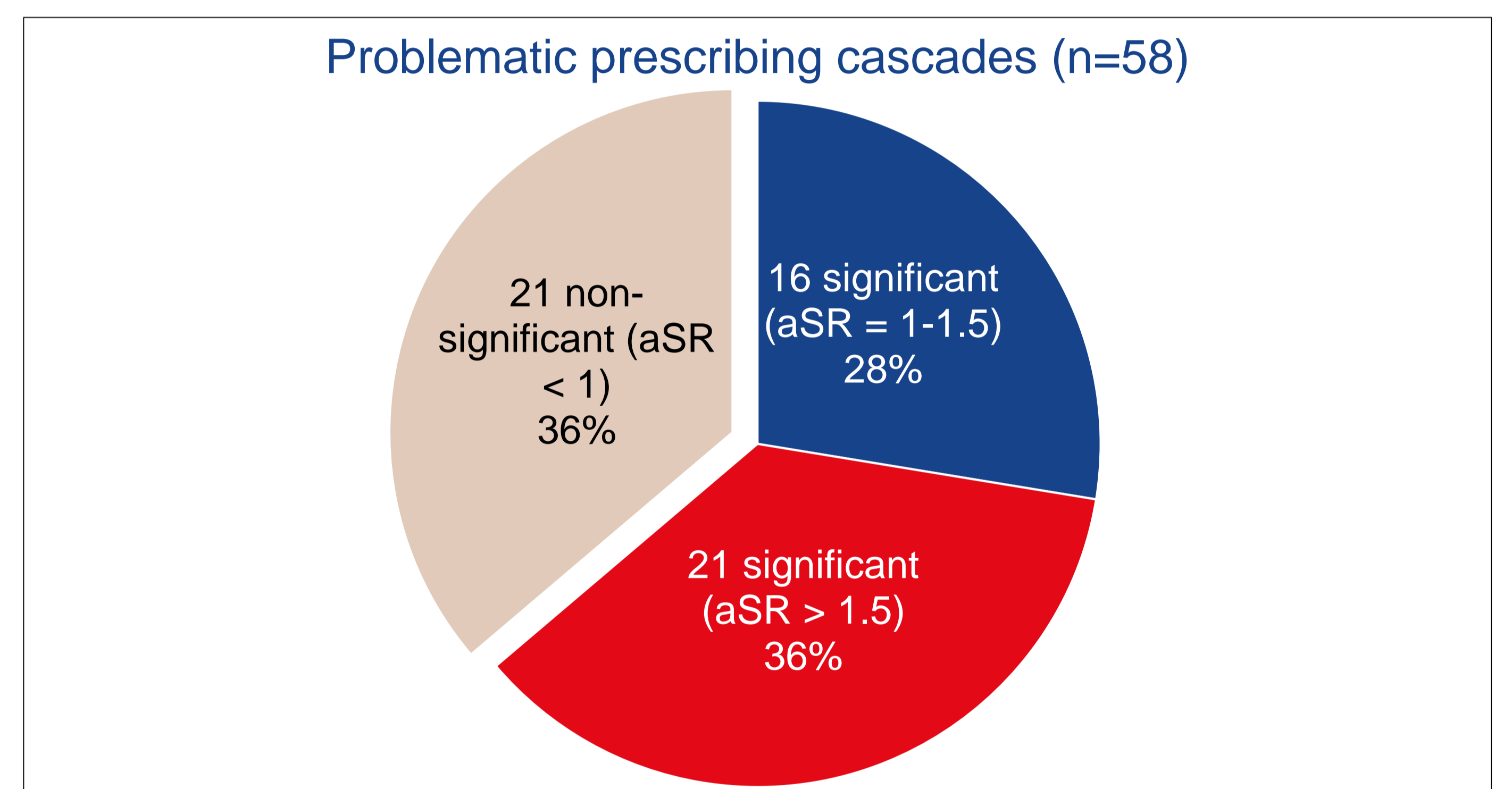


Figure 2. The aSRs for 58 problematic prescribing cascades.

The highest aSR was 4.28 (95% CI 4.08-4.49) for the prescribing cascade of amiodarone (index) followed by thyroid hormones (marker), based on 654 patients.

Table 1. Three prescribing cascades with the highest aSR values.

Index medication	Adverse drug reaction	Marker medication	cSR (i-m)/(m-i)*	aSR (95% CI)
Amiodarone	Hypothyroidism	Thyroid hormones	4.95 (544/110)	4.28 (4.08-4.49)
Ace-inhibitors	Cough	Cough and cold preparations	2.70 (17331/6418)	2.43 (2.40-2.46)
Proton pump inhibitors	Infection	Antibiotics	2.49 (8712/3493)	2.29 (2.25-2.32)

*i-m are patients where index is prescribed before marker, m-i are patients where index is prescribed after marker.

Conclusion

Out of 58 problematic prescribing cascades, 37 (64%) had a significant association in the prescription sequence symmetry analysis. To prevent problematic prescribing cascades, more awareness amongst healthcare providers is needed.

In collaboration with:

