PHARMACOGENOMICS: MAKING AN IMPACT ON PATIENTS

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INTRODUCTION

The Netherlands is a global leader in the field of pharmacogenomics (PGx). Since 2005, the Dutch Pharmacogenetics Working Group (DPWG) has developed evidence based guidelines. All guidelines are available through the national drug database (G-Standaard). This database is used by all parties within the Dutch healthcare system. However, the implementation and acceptation of PGx testing in primary care is lagging. To further stimulate the use of these guidelines, the Royal Dutch Pharmacists Association (KNMP) initiated a pilot in community pharmacies across the Netherlands

AIM

To demonstrate the impact of PGx testing by community pharmacists on individual patients.

METHODS

From June 2017 until June 2018 patients in 50 Dutch community pharmacies were offered a PGx test. Prior to this pilot all participating pharmacists were trained in pharmacogenomics. The pharmacists were the lead healthcare provider in this pilot. If applicable, the pharmacists advised changes in pharmacotherapy and monitored the impact on patients. Patient outcomes were reported and PGx test results were added to patients' medical record. Pharmacists also shared case reports.

Position of pharmacogenomics in the pharmacy

The pharmacist is the expert in medication and PGx. Gene-drug interactions are part of the pharmacists' routine medication surveillance.

The pharmacist:

- Selects patients that could potentially benefit from personalised treatment;
- Counsels the patient;
- Collects material for PGx test (buccal swab/saliva);
- Orders a PGx test;
- Sends material to laboratory;
- Interprets the PGx test results;
- Adds test results to the patients' medical record;
- Reports test results to other healthcare providers;
- Discusses therapy optimisation with other healthcare providers;
- Provides advice on changes to patients' pharmacotherapy based on the outcome of the PGx test.

RESULTS

The participating pharmacists selected patients to receive a pharmacogenomics test and personalised advice. 215 patients were included in the pilot: 148 women and 67 men. The average age was 60 years old. Combined, the 215 included patients used 249 medicines for which PGx guidelines are available. Patients were asked about their expectations and their willingness to pay. 33% of the included patients had low expectations of PGx testing and 62% had moderate to high expectations. Patients with high expectations reported a three times higher willingness to pay more than €100 per test when compared to patients with low expectations. An overview of medicines that triggered the pharmacist to consider PGx testing is shown in figure 1. Outcomes of the PGx tests are shown in figure 2 and actions undertaken after PGx testing are shown in figure 3. 28,5% of PGx tests resulted in the pharmacist undertaking action concerning patients' pharmacotherapy.

On average the pharmacist spends 87 minutes per patient. See text box for an overview of pharmacists' activities. Pharmacists shared several case reports. These case reports provide an insight in the positive impact of PGx testing on patients. Two cases are presented below.

Figure 1. Medicines that triggered PGx testing

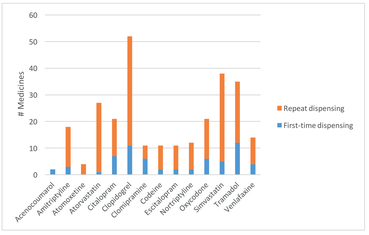
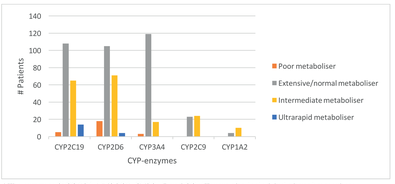
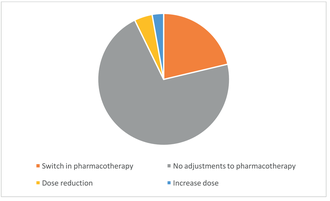


Figure 2. Outcomes tested CYP-enzymes and phenotypes*



** The enzymes SLCO1B1, VKORC1, CYP3A5 and COMT were also tested, but phenotypes where not recorded or PGx guidelines are not available yet.*

Figure 3. Actions undertaken after PGx testing



CONCLUSION

Pharmacists play a key role in the implementation of pharmacogenomics in primary care. Pharmacogenomic testing is perceived as a valuable addition to the existing pharmaceutical care programs by patients, pharmacists and prescribers.

Case 1

- A 79-year-old female patient is diagnosed with polyneuropathy. She is prescribed nortriptyline 10mg once daily before the night.
- Within a week she develops severe tremors, sweating and a dry mouth.
- The nortriptyline treatment is discontinued and the side effects are resolved.
- A pharmacogenomic test later shows the patient is a CYP2D6 poor metaboliser.
- The PGx advice is a 60% dose reduction.

Case 2

- A 79-year-old male with systolic heart failure used metoprolol in the past. Patients' medical record contains a note from the cardiologist: 'Patient should never be prescribed a beta blocker again'.
- A pharmacogenomic test shows the patient is a CYP2D6 poor metaboliser. Dose adjustment for poor metabolisers is only advised for metoprolol, not for other beta blockers.
- Contraindication CYP2D6 poor metaboliser is added to the medical record.
- The pharmacist advised bisoprolol 1,25 mg if the use of a beta blocker is still indicated.

'Finally some recognition! We knew something wasn't right.'

Quote from the emotional sister of a psychiatric patient who turned out to be a PM for CYP2D6.

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