

LETTER TO THE EDITOR

Patient monitoring: the hidden costs of treatment with antipsychotics

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Antipsychotics are an important and frequently used treatment option for patients with schizophrenia. During treatment patients need to be monitored to determine effectiveness and safety, therefore total drug treatment costs also include the costs of patient monitoring. In this study we assess the proportion of patient monitoring as a part of antipsychotic treatment costs in patients with schizophrenia.

All oral formulations of antipsychotic agents with a European or Dutch marketing authorization and available in the Netherlands in April 2014 were included in this study. Patient monitoring instructions vary among antipsychotic drugs and were found in the most recent Summary of Product Characteristics (SmPC) at the website of the Dutch Medicines Evaluation Board or European Medicines Agency by searching on the generic name [1]. Patient monitoring was defined as a statement to do something prior to or during drug treatment, including measurements of (possible) side effects and comorbidities. Instructions mentioned in multiple sections of the SmPC were combined. Monitoring instructions for combinations of drugs, intoxications or directed specifically at either newborns or pregnant women were excluded. The decision to prescribe antipsychotics depends on the evidence, experience and known safety for these specific patient populations. Monitoring during intoxications depends on the severity of the intoxication and is not of influence during regular treatment. Confirmation of contraindications was not regarded as monitoring. Based on the wording of each instruction, the requirement for monitoring was determined as 'mandatory' or 'advised'. Whether monitoring was directed at all patients or a specific patient population was assessed. The monitoring frequency was determined based on the information provided. When missing, a minimum of once and maximum of four times a year was used based on consensus of the authors. Monitoring that

is solely performed by observation was not incorporated into the analysis. These parameters are expected to be assessed during regular visits and would not result in additional differences in costs.

Total drug treatment costs were determined as the sum of drug costs and patient monitoring costs. Drug costs were acquired from the Dutch Healthcare Institute website by selecting the lowest price using the Defined Daily Dose during one year of treatment including the pharmacy dispensing fee (€12 for a first and €6 for a repeat dispensing) [2]. Unit prices for laboratory tests were obtained using the reference prices from the Dutch Healthcare Authority (NZA) 2014 including laboratory order costs (€11) per point of time [3]. Costs for physical tests were calculated based on costs for the specific test or for a consultation with a general specialist or medical specialist [3, 4]. Costs for a consultation were obtained using the Dutch guidelines for cost research, methods and standard price units for economic evaluations in health care [4]. Reference prices for outpatient clinics were based on a consultation in a general hospital [4].

Marked variations in the proportion of patient monitoring within antipsychotic drug treatment costs are shown in Table 1 (range 0–83%). Mean drug treatments costs were €461 (range €100–€1660) per drug per year, with proportion of mandatory monitoring costs >20% among 37% of the antipsychotics. A proportion of 0% and 0–20% was found for 47% and 16% of the antipsychotics, respectively. The proportion of patient monitoring costs was highest for olanzapine (83%; €230/€277), clozapine (70%; €412/€590) and risperidone (47%; €47/€100). For some antipsychotics the share of mandatory monitoring is low; however, advised monitoring and monitoring for specific patient groups can lead to additional costs. For example, for aripiprazole, monitoring costs range from €47 to €187 for patients with

Table 1

Total drug treatment costs including patient monitoring costs based on instructions in the Summary of Product Characteristics

Drug name	Drug costs including the pharmacy dispensing fee	Costs mandatory patient monitoring (min; max)	Costs advised patient monitoring (min; max)	Costs mandatory patient monitoring for specific patient groups (min; max)	Costs advised patient monitoring for specific patient groups (min; max)	Total drug treatment costs	Minimum proportion of patient monitoring costs
Risperidone	€54	€47; €187	€0; €0	€5; €19	€64; €256	€100	0.47
Quetiapine	€73	€28; €112	€0; €0	€19; €75	€0; €0	€101	0.28
Zuclopendixol	€137	€0; €0	€64; €256	€0; €0	€37; €147	€137	0.00
Haloperidol	€110	€33; €33	€14; €54	€0; €0	€0; €0	€144	0.23
Pimozide	€153	€47; €188	€0; €0	€0; €0	€0; €0	€200	0.23
Flupentixol	€212	€0; €0	€64; €256	€0; €0	€0; €0	€212	0.00
Perphenazine	€222	€0; €0	€64; €256	€0; €0	€0; €0	€222	0.00
Pipamperone	€223	€0; €0	€0; €0	€0; €0	€28; €112	€223	0.00
Bromperidol	€234	€0; €0	€0; €0	€0; €0	€0; €0	€234	0.00
Penfluridol	€263	€0; €0	€0; €0	€0; €0	€0; €0	€263	0.00
Chlorprotixene	€234	€33; €134	€78; €310	€0; €0	€0; €0	€267	0.13
Olanzapine	€47	€230; €251	€4; €4	€12; €47	€0; €0	€277	0.83
Pericazine	€234	€73; €194	€0; €0	€8; €33	€0; €0	€307	0.24
Tiapride	€335	€0; €0	€75; €75	€5; €5	€0; €0	€335	0.00
Clozapine	€178	€412; €412	€6; €25	€116; €349	€0; €0	€590	0.70
Sulpiride	€714	€0; €0	€75; €75	€8; €65	€0; €0	€714	0.00
Paliperidone	€1,294	€28; €112	€0; €0	€24; €94	€0; €0	€1,322	0.02
Aripiprazole	€1,451	€0; €0	€0; €0	€47; €187	€0; €0	€1,451	0.00
Sertindole	€1,465	€195; €279	€0; €0	€18; €65	€8; €33	€1,660	0.12
Mean	€402	€59; €100	€23; €69	€14; €49	€7; €29	€461	0.13

Total drug treatment costs are calculated as the sum of drug costs including the pharmacy dispensing fee and minimal costs for mandatory patient monitoring. The minimal proportion of patient monitoring costs is calculated by dividing the minimal costs for mandatory patient monitoring by the total drug treatment costs.

diabetes or bipolar mania. Patient monitoring instructions with the highest cost impacts were consultations with a medical specialist (€64, e.g. for an ophthalmic examination) or a general practitioner (€28, e.g. for a physical examination). Additionally, electrocardiograms (€33) and blood glucose measurements (€8) had an influential share in monitoring costs.

Total drug costs consisted of >20% mandatory monitoring costs for over one-third of all antipsychotics based on minimal required patient monitoring. The proportion of patient monitoring costs may increase when patents expire, as the average price of the drugs then declines. Total drug treatment costs can be greatly influenced by mandatory and recommended monitoring instructions and may differ among specific patient groups. The proportion of monitoring costs within total drug costs is shown for patient monitoring of antipsychotics in The Netherlands. This principle is generalizable to other medicines and countries where monitoring is of importance. Due to the high share of patient monitoring costs, we advocate the use of total drug treatment costs in decision making for clinical practice.

Competing Interests

All authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available

on request from the corresponding author) and declare: no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

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