

# Consumption of Inappropriate Psychotropic Drugs in Residential Homes for the Elderly: Comparative Study Between 2001 and 2006

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## Abstract

**Objective:** To evaluate the comparison of the consumption of inadequate psychodrugs (PI) in institutionalized population.

**Method:** Before-after study, that includes ambulatory prescriptions (CatSalut) made in the nursing homes centers of a Sanitary Region during year 2001 (reference, 107 centers) and 2006 (comparison, 152 centers) respectively. PI was considered (Beers Criteria), 15/72 active principles pertaining to the subgroup-therapeutic ones: antidepressants, neuroleptics, sedatives-hypnotics, and tranquilizers. The measurement of the consumption was made by means of the establishment of quantitative indicators in defined daily dose (DDD), packages, and cost. Statistical meaning,  $P < 0.05$ .

**Results:** Studied patients: 4795 and 6350 (years, 2001-2006, respectively), the global use of psychodrugs in DDD was of 1 508 061 and 2 286 347. The PI use was of 19.0% (confidence intervals of 95% [CI], 17.9-20.1) as opposed to 12.5% (95% CI, 11.5-13.5). Increases of DDD/resident in some PI are observed: perfenazine (22.6%), halazepam (28.6%), amitriptyline (15.9%), clobazam (16.6%), and diazepam (6.6%),  $P < 0.001$ .

**Conclusions:** A tendency in diminishing the consumption of PI in institutionalized patients is observed, although its use continues being elevated. An excessive drug use exists with anticholinergic and sedative properties, reason why specific interventions would be due to make, with the purpose of improving the rational use of the drugs in this sensible group of patients.

**Key words:** Inappropriate psychodrugs. Nursing homes. Drugs use.

## Consumo de psicofármacos inapropiados en residencias geriátricas: estudio comparativo entre los años 2001 y 2006

**Objetivo:** Evaluar la comparación del consumo de psicofármacos inadecuados (PI) en población institucionalizada.

**Método:** Estudio antes-después, que incluye las recetas ambulatorias (CatSalut) realizadas en los centros residenciales geriátricos de una Región Sanitaria durante el año 2001 (referencia: 107 centros) y 2006 (comparación: 152 centros), respectivamente. Se consideraron PI (Criterios Beers) 15/72 principios activos pertenecientes a los subgrupos-terapéuticos: antidepresivos, neurolepticos, sedantes-hipnóticos y tranquilizantes. La medición del consumo se realizó mediante el establecimiento de indicadores cuantitativos en dosis diaria definida (DDD), envases y gasto. Significación estadística,  $p < 0,05$ .

**Resultados:** Pacientes estudiados: 4.795 y 6.350 (años: 2001 y 2006, respectivamente), la utilización global de psicofármacos en DDD fue de 1.508.061 y 2.286.347. El uso de PI fue del 19% (intervalos de confianza del 95% [IC]: 17,9-20,1) frente al 12,5% (IC del 95%, 11,5-13,5). Se observan incrementos de DDD/residente en algunos PI: perfenazina (22,6%), halazepam (28,6%), amitriptilina (15,9%), clobazam (16,6%) y diazepam (6,6%),  $p < 0,001$ .

**Conclusiones:** Se observa una tendencia en disminuir el consumo de PI en pacientes institucionalizados, aunque su uso sigue siendo elevado. Existe una excesiva utilización de fármacos con propiedades anticolinérgicas y sedativas, por lo que se deberían realizar intervenciones específicas, con la finalidad de mejorar el uso racional del medicamento en este sensible colectivo de pacientes.

**Palabras clave:** Psicofármacos inadecuados. Residencias geriátricas. Uso de medicamentos.

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## INTRODUCTION

The progressive ageing of the population and continuous progress in terms of diagnosis and therapies, along with better health education in developed countries, is represented in cultural and economic aspects and in healthcare services for the elderly, resulting in an increased consumption of healthcare resources.<sup>1</sup> A greater predominance of chronic disease and multiple pathologies, with significant polypharmacy and fragility all have an impact on the care given to the elderly. Functional dependency (daily activities) and cognitive deterioration are some of the factors associated with this group of patients, some of which are institutionalised in residential homes for the elderly.<sup>2-5</sup>

The proper use of psychotropic drugs in the elderly begins with the intrinsic definition of appropriate and inappropriate practices. In this respect, several explicit (Beers Criteria) or implicit (Medication Appropriateness Indexes) measurement methods are available, all of which are based on guidelines for clinical practice with proven evidence.<sup>6-9</sup> Within this context, the range of therapeutic options (in general) and the use of psychotropic drugs (in particular), dedicated to the care of the elderly is extensive, twice that of those who live in their own homes and there is therefore a greater risk of developing adverse effects, of inappropriate use, drug interactions and medication errors.<sup>5-10</sup>

Optimising effective and efficient pharmaceutical care and promoting actions aimed at advertising the rational use of drugs, as well as improving quality, are the responsibility of all those involved in prescribing and/or dispensing drugs. In this respect, CatSalut (The Catalonia Healthcare Service) is developing intervention strategies aimed at tackling this problem within residential care homes.<sup>11</sup> There exists very little evidence on the evaluation of psychotropic drugs in residential care homes for the elderly in Catalonia and the results obtained are below standard.<sup>12-14</sup>

The aim of the study was to evaluate the evolution of the consumption of inadequate psychodrugs (PI), according to the Beers criteria, in an institutionalised population belonging to a regional healthcare service within a normal clinical practice context.

## METHODS

A before and after study was carried out, which included all outpatient prescriptions prepared with an official medical prescription (CatSalut), individualised by doctor, in residential care homes for the elderly within the Barcelona Regional Healthcare Service (Headquarters in Badalona), and in the Barcelonés Norte and El Maresme sectors, during the period between January and December 2001 (107 centres; base period) and 2006 (152 centres; comparison period). The total population for this area is more than 715 000 inhabitants and 15.8% are aged over 65. Each residential home for the elderly constitutes

the study unit, regardless of whether it is a public or private home, or whether it provides services to one or more managing bodies.

A prior analysis of the situation was carried out (considered as the pre-intervention base scenario) on official medical prescriptions for drugs, products and aids issued between January and December 2001. An intervention programme was established over the following 5 years to improve prescriptions. The aim of this was to raise awareness of, reach a consensus on and subsequently improve the rational use of drugs. The programme was based on efficiency criteria, established via a series of qualitative indicators.<sup>11</sup> No specific action was taken to decrease the prescription of PI, however the programme did include some indicators to help select certain benzodiazepines and antidepressants. The residential care homes were incorporated into the programme consecutively: 21 centres in 2002; 32 centres in 2003; 126 centres in 2004; 132 centres in 2005; and 152 centres in 2006 (all of which belonged to the sector). The criteria for incorporation into the programme were: *a)* the total expenditure on drugs in each centre and the annual increase; *b)* the incorporation of monitoring activities carried out by the reference supplier; and/or *c)* below standard qualitative or efficiency indicators. The final situation or annual comparison period included the accumulated prescriptions issued between January and December 2006. The specific actions carried out in the intervention group are listed in Table 1.

PI (Beers<sup>8</sup>) were considered as 15 out of 72 active ingredients belonging to the following therapeutic subgroups: antidepressants, neuroleptics, sedative-hypnotics, and tranquilisers (Guidelines for ATC Classification). Consumption was measured by establishing quantitative indicators for the defined daily dose (DDD), the DDD among the residents (calculated according to the census for the month of December for each year of the study) and the expenditure or containers, in total and in terms of psychotropic drugs (Tables 1 and 2). The different text files obtained from CatSalut's Prescription Monitoring Program (PMP) were used to perform the calculations. The data matrix was created and cross tabulation performed in an application specifically created by the authors with support from Microsoft Access®. A univariate descriptive statistical analysis was carried out to establish the indicators, with 95% confidence intervals (CI) and a bivariate analysis, using the Student *t* test significance test or the comparison of proportions for independent groups between the observation periods (2001 and 2006). A *P* value less than .05 was considered significant, using the SPSS program, version 12.

## RESULTS

Based on 4795 and 6350 patients (2001 and 2006, respectively), the global use of psychotropic drugs in terms of DDD was 1 508 061 and 2 286 347 (containers, 77 062 and 115 739, respectively). The general characteristics of the series studied between 2001 and 2006 are outlined in Table 2. The number of residents increased

**Table 1.** Intervention Strategy Followed During the Programme

Action Carried out	Description and Details
a) Introductory letter	Introducing the programme, its objectives and consent for inclusion. A questionnaire was also issued to update general and clinical care information on the residence, to be completed and returned
b) Initial informative interview (face to face)	The interview was 1 or 2 hours long and included healthcare professionals and managers from each residential care home, as well as a professional or coordinator from the primary care centre responsible for issuing the medical prescriptions. The interview included detailed information for analysis of the situation and the monitoring process
c) Publication of a bi-monthly dashboard	This included both general and specific information and details of the quantitative and qualitative indicators for monitoring. For feedback on the information, a general list per therapeutic group and product ranking accumulated per cost was also created
d) Monitoring during the programme	Several interviews (between 2 and 4) were held for monitoring purposes during the monitoring comparison period (2002 and 2006). These were held in the residential care home itself and/or the attached primary care centre. The aim was to highlight the achievements and/or establish specific recommendations agreed upon by healthcare professionals in order to correct any deviations

by 32.4%, the average expenditure per resident/year was €1 575.61 compared to €1 929.03, respectively (increase of 22.4%,  $P<.001$ ). The expenditure on psychotropic drugs was 11.8% of the total expenditure compared to 12.8% (increase of 7.8%,  $P=.039$ ) and the average expenditure per resident/year was €186.45 compared to €246.02, respectively (increase of 31.9%,  $P=.01$ ). The consumption of containers per resident was similar for both study periods.

The relative consumption of PI during the comparison period showed a decrease of -27.5% in terms of containers and -14.5%

in DDD/resident,  $P=.003$  (Table 3). The prevalence of use of PI was 19.0% (95% CI, 17.9-20.1) compared to 12.5% (95% CI, 11.5-13.5) during the study periods, with a 95% CI for the difference between proportions of 5.2-1.9,  $P=.001$ . Improved consumption was observed in all therapeutic groups, although the following are to be noted: antidepressants (25.6% compared to 13.1%; increase of -48.6%,  $P=.001$ ) and sedative-hypnotics (6.7% compared to 3.8%; increase of -42.9%,  $P=.001$ ). With respect to the neuroleptic group, thioridazine was removed from the market during the monitoring period. In terms of active

**Table 2.** General Characteristics of the Series Studied Between 2001 and 2006<sup>a</sup>

General Characteristics Comparison Period	Reference Year 2001	Comparison Year 2006	Increase 5 Years, %
Number of participating centres	107	152	42.1
Total number of doctors	163	217	33.1
Number of residents	4795	6350	32.4
Number of incontinent patients	3846	4260	10.8
Total number of containers dispensed	513 967	772 544	50.3
Total expenditure on drugs and aids	€7 555 052.76	€12 249 354.17	62.1
Number of containers (psychotropic drugs)	77 062	115 739	50.2
Expenditure on psychotropic drugs	€894 034.24	€1 562 238.82	74.7
General indicators			
Average expenditure per resident/year	€1576.61	€1929.03	22.4
Average number of containers per resident/year	107.2	121.7	13.5
Average expenditure per container/year	€14.70	€15.86	7.9
Indicators for psychotropic drugs <sup>b</sup>			
Percentage of the total expenditure	11.8	12.8	7.8
Percentage of the total containers	15.0	15.0	-0.1
Average expenditure per resident/year	€186.45	€246.02	31.9
Average number of containers per resident/year	16.1	18.2	13.4
Average expenditure per container/year	€11.60	€13.50	16.3

<sup>a</sup>% indicates percentage; drug expenditure (retail price) given in euros (€)

<sup>b</sup>Antidepressants, neuroleptics, sedative-hypnotics, and tranquilisers (Guidelines for ATC Classification).

**Table 3.** Evolution of the Consumption of Inappropriate Psychotropic Drugs per Therapeutic Group and Active Ingredients (2001-2006) in the Barcelona Regional Healthcare Service (Headquarters in Badalona)<sup>a</sup>

Therapeutic Subgroup	Description of the Active Ingredient	DDD 2001	%	DDD 2006	%	Annual Increase	P
Antidepressants	Amitriptyline	9220.8	8.9	10 687.6	11.1	15.9	.001
	Doxepin	532.5	0.5	100	0.1	-81.2	NS
	Imipramine	5066	4.9	3573	3.7	-29.5	NS
	Fluoxetine	88 354	85.6	81 520	85	-7.7	NS
	Total DDD	103 173.3	100	95 880.6	100	-7.1	
Sedative-hypnotics	% IP/subgroup	25.6		13.1		-48.6	.001
	Flurazepam	4260	20.5	2010	12	-52.8	.001
	Quazepam	780	3.7	1470	8.8	88.5	.001
	Flunitrazepam	15 780	75.8	13240	79.2	-16.1	.032
	Total DDD	20 820	100	16 720	100	-19.7	
Tranquilisers	% IP/subgroup	6.7		3.8		-42.9	.001
	Bromazepam	6412.5	4.5	5799	3.3	-9.6	.034
	Clobazam	15 930	11.2	21 050	11.9	32.1	NS
	Dipotassium clorazepate	53 490	37.7	56 629.5	32.1	5.9	NS
	Diazepam	64 832.4	45.7	91 133.6	51.6	40.6	.001
Neuroleptics	Halazepam	1224	0.9	1884	1.1	53.9	NS
	Pinazepam	107.5	0.1	105	0.1	-2.3	NS
	Total DDD	141 996.4	100	176 601.1	100	24.4	
	% IP/subgroup	24.7		23.4		-5.2	.041
	Perphenazine	906.7	4.5	2013.3	100	122.1	.001
Neuroleptics	Thioridazine	19 392.7	95.5	0	0	-100	NS
	Total DDD	20 299.3	100	2013.33	100	-90.1	
	% IP/subgroup	9.3		0.5		-94.1	.001

<sup>a</sup>DDD indicates defined daily dose; IP, inappropriate psychotropic drug; NS, not significant; P, statistical significance.

ingredients, increases in DDD/resident were observed in some PI: perphenazine (22.6%), halazepam (28.6%), amitriptyline (15.9%), clobazam (16.6%), and diazepam (6.6%),  $P>.001$  in all cases. The consumption of diazepam represented 45.7%-51.6% of the sedative-hypnotic subgroup (increase of 40.6%;  $P=.001$ ).

## DISCUSSION

The study highlights the apparent polymedication in elderly patients institutionalised in residential care homes (average containers per resident/year, 107.2 compared to 121.7; increase of 13.5%) and psychotropic drugs in particular (16.1 compared to 18.2; increase of 13.4%). This trend is undoubtedly influenced by the high morbidity rate, functional dependence and cognitive deterioration of this group of patients. However different scientific bodies and groups of experts recommend specific monitoring in patients undergoing treatment with psychotropic drugs and the possible interactions and adverse effects.<sup>8,15-19</sup> These authors suggest that a specific comparison is required for those patients in treatment with digoxin, oral anticoagulation, lithium,

anticonvulsants, antipsychotics, sedative-hypnotics, opioids, and anticholinergics, since these drugs carry a high risk level. It is for this reason that, although it is very difficult to avoid using such drugs or to limit the duration of use in accordance with expert recommendations in clinical practice, it is important to try and select those benzodiazepines that have a higher safety profile.

It is to be noted that the different methodologies used in the studies on the use of these drugs in residential care homes in terms of measuring the pharmaceutical prescription and the high level of flexibility in consumption (which is more linked to the range of drugs on offer and new additions to the market) makes comparisons difficult and limits the external validity of the results. However, these unforeseeable aspects do not undermine the knowledge obtained from this type of institutionalised patient since there must be similarities in the clinical practice styles and organisational model, which would not influence the results.

The use of PI is a significant problem and one which is expected to grow, given that the elderly population living in such institutions is currently the main consumer of this type of drug in Spain.



Moreover, not much is known about the pharmacological response in young people and there continues to be very few clinical studies among this population.<sup>7,15-16</sup> One of the main reasons for using PI is the lack of consensus concerning the definition of the inappropriate use of psychotropic drugs, lack of evidence showing that the effect on residents is impacted by the implementation of guidelines, characteristics of the doctor (negativity regarding aging and the efficacy of action among this group) and/or difficulties in coordination with specialist care services.<sup>3,6,9,14</sup>

The present study observed moderate use of PI (19.0% in 2001 and 12.5% in 2006), as well as the excessive use of drugs with anticholinergic properties and sedatives with a long half-life (Table 3). The general and specific results are similar to those obtained in studies performed by other authors in which the prevalence of consumption using the Beers Criteria was between 10% and 40%.<sup>9,12,16-25</sup> The studies reviewed showed that the aging of the population tends to increase expenditure on outpatient drugs, however if this is used as a predictor for expenditure the magnitude of the problem is underestimated. In addition, polypharmacy (more than 5 drugs), the use of certain anxiolytics, depression, and age over 85, are independent factors associated to the use of PI.<sup>7,16</sup> The need to reduce the inappropriate consumption of drugs is therefore clear, as is the need to optimise the efficiency of pharmaceutical care and promote strategies aimed at facilitating the rational use of drugs and improving the quality of prescriptions using criteria for safety and efficacy. However rather than focusing on controlling consumption among the elderly, the criteria must promote cost-effective prescription habits.

With regard to limitations to the study, factors related to the methodological design may influence the comparability of the groups (before-after) during the study's comparison period (2001-2006). There may also be possible bias in the selection and classification, geographic or temporal mobility to which the subjects may be subject and possible variations in the severity or rate of morbidity established. Also to be borne in mind is the selective purchasing on the part of the managing bodies (whose clients include some of the residential care homes studied), possible administrative errors in assigning prescription pads to prescribing doctors and strategies for intervention by other bodies or by free will, which may influence the results.

It would be useful to have new studies to support the consistency in the results and therefore future investigations should adjust or correct the effect of morbidity and its associated factors (indication-prescription studies). The Healthcare Service must promote specific actions to improve doctor training via consensus with experts within the specialist care services from which the residents are referred (induced demand; coordination between care services), improve the information systems aimed at the systematic monitoring of prescription profiles (group meetings) and put forward actions for health education in the residential care homes. In conclusion, a decrease in the consumption of PI among institutionalised patients was observed, although the use of such drugs still remains high. There is an excessive use of drugs with anticholinergic and sedative properties (long half-life). Specific

action must be taken to improve the quality of the prescription profile and the rational use of drugs within this sensitive area.

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