

Analysis of medication adherence using electronic prescriptions in a community pharmacy: 'REACT' study

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KEYWORDS

Medication adherence, Proportion of Days Covered, electronic prescription, community pharmacy

ABBREVIATIONS

ATC: anatomical therapeutic Chemical
CI: confidence interval
INN: international nonproprietary name
IQR: interquartile range
MGL: Morisky Green Levine
OTC: over the counter
PDC: proportion of days covered
SD: standard deviation

ABSTRACT

Background: Patients' lack of adherence to pharmacological treatments has a major impact, both clinical and economical. While different methods are used to measure adherence, retrospective studies are being used more frequently as they are more objective, less prone to bias by patient perception and interfere less with patients' lives. The electronic prescription system provides the community pharmacy with a useful tool to conduct this research.

Objective: To measure the adherence of patients to their chronic medication considering different therapeutic drug groups and their mental health using electronic prescription information available in a database.

Methods: An observational, ambispective and logitudinal study was developed for 300 patients. Adherence was assessed using Proportion of Days Covered (PDC) per patient and per treatment and the Morisky Green Levine test. Data on patients' dispensed medication for the last 12 months was obtained through the electronic prescription system. Data on patient mental health was gathered using the PHQ-2 screen for depression.

Results: A total of 300 patients were recruited, but only 290 were included in the analysis. 25.5%; [95%CI: 20.6:30.9] were classified as polymedicated. The median PDC per patient was 0.90 (IQR: 0.73 - 1). According to the Morisky Green Levine questionnaire, 57.9% of the patients [95%CI 52.0:63.6] adhered to their treatments. Concurrence between the Morisky Green Levine test and the PDC had a kappa $\kappa=0.086$.

Conclusion: The electronic prescription turned out to be a useful tool to gain insight into adherence to long-term treatments measured in terms of the PDC.

INTRODUCTION

Medication adherence was defined by the World Health Organization as "the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (1). Failure to adhere to such recommendations has relevant clinical and economic consequences (2,3).

In Spain, each autonomous community has a different electronic prescription system. In Madrid, where this study was carried out, the electronic prescription allows pharmacists to access to the patient's prescription history and to know what prescriptions have been dispensed. Similarly, there is experience in population groups in several countries where it has been possible to determine patients' adherence to their treatments thanks to the electronic prescription system. (4). Measure of adherence in retrospective studies based on refill data or electronic prescriptions has been widely used in recent years as health organizations have extensively incorporated health information systems and because this methodology is more objective, less invasive and makes data easy to analyse (5).

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Several studies have been conducted on adherence in populations, under different conditions and by using electronic prescriptions, but only a few studies have compared adherence rates across patients with multiple conditions and in treatment with different therapeutic drug groups.

OBJECTIVES

The main objective of the study was to analyze the adherence of the population to their chronic treatments through the electronic prescription registry in a community pharmacy, analyzing adherence according to the therapeutic groups prescribed, the dosage, the number of treatments and the denomination in which the prescription is prescribed.

Secondary objectives of the study were to determine the relationship between adherence and other patient-related factors such as sociodemographic characteristics, the use of antidepressant or anxiolytic drugs, and mental health.

METHODS

The 'REACT STUDY: Electronic Prescription, Adherence and Compliance' is an observational, ambispective, longitudinal study in which the adherence of patients with chronic conditions to their treatments was analysed through the electronic prescription system. The study was conducted in one community pharmacy in Madrid, Spain, between February 2020 and October 2020. The electronic prescription system in Madrid allows pharmacists to see patient's prescriptions and their dosage regimen, as well as the dispensing history of the last 12 months retrospectively.

To randomize patient recruitment, the first four patients with chronic conditions who entered the community pharmacy in the morning and the first four patients who entered in the afternoon were recruited. Before being allowed to participate in the study, patients were thoroughly informed about the objectives of the study and they voluntarily signed the informed consent form and the legally binding data protection guarantee document. All patient data were collected by two pharmacists in a case report form and transcribed to a database in which the information was anonymized for subsequent statistical analysis. The pharmacists in charge of data collection received prior training to prevent bias.

Inclusion and exclusion criteria

Patients had to be 18 or older and included in the Community of Madrid's electronic prescription system for at least the last 12 months and had to be receiving long-term treatment for any type of chronic condition. Patients receiving medication for dementia or cognitive decline (drug group N06D) such as donepezilo, galantamine, memantine, rivastigmine

or ginkgo were excluded from the study. Patients living in geriatric centres were likewise excluded.

Data collection

Sociodemographic data collected was age, sex, country of origin, level of studies and family and labour situation. Patients completed the Morisky Green Levine short questionnaire for adherence, as the gold standard in community pharmacy to evaluate adherence. In relation to the mental health of the patients, a screening of depression was performed with the PHQ-2 brief instrument. (Patient Healthcare Questionnaire 2-Item) and a satisfaction questionnaire on electronic prescriptions (PERSA), the results of which were previously published (6), was completed.

Information regarding medications dispensed through the e-prescription scheme over the preceding 12 months was obtained when the patient visited the community pharmacy and agreed to participate in the study. As there is no consensus regarding the definition of a polymedicated patient, we adopted the following criteria: < age 65 being treated with at least 10 drugs, ≥ age 65 being treated with at least six drugs and ≥ age 80 being treated with at least five drugs (7).

The rate of adherence to electronic prescriptions was calculated with the Proportion of Days Covered (PDC) ratio. The PDC is a method to determine adherence that has been studied extensively in recent years (8–10). It is calculated by determining a measurement period (in this study, it was 365 days), counting the days with medication covered by the drug under study and performing the following ratio:

$$PDC = \frac{\text{Number of days with medication during period}}{\text{Number of days from first dispensing to the end of period}}$$

Patients with a PDC of 80% or higher are considered adherent to their treatments (9). PDC was calculated per patient and per treatment and a PDC with a maximum value of 1 was considered for the purpose of statistical analysis.

The type of treatment prescribed was classified according to the World Health Organization's Anatomical Therapeutic Chemical classification system (ATC) and we noted whether the prescription was made by international non-proprietary name (INN), generic or a brand name pharmaceutical. Prescriber information regarding the format, dosage and units of administration of each drug was available from the electronic prescription and registered in the data collection notebook.

As the study was intended to measure adherence to long-term treatments, only drugs used to treat chronic diseases were analysed, being these those treatments prescribed for at least three months in the electronic prescription system. Drugs prescribed for short-term use such as antihistamines, laxatives, antibiotics, cough and cold preparations, dermatological preparations or anti-inflammatory

creams were not included. Other drugs such as the following were also excluded: nutritional supplements, insulin (as dosage varies significantly for patients over the course of the year) and over-the-counter (OTC) products as these are sometimes excluded from the e-prescription scheme and are mainly used in short term treatments. Some analgesics, such as paracetamol and metamizole that are typically used for short-term treatments, are often prescribed for long term use among the elderly and therefore have been included in the analysis.

Statistical analysis

Statistical analysis was conducted using the SPSS v26 program (IBM Corporation, Armonk, NY, USA). The sample size for the study (n=322) was calculated assuming an adherence rate of 50% (1,11,12), with a level of statistical specification of $\alpha=0.05$ and considering a population of 2,000 patients within the area served by the community pharmacy. COVID-19 complicated recruitment but in the end we were able to include 300 patients.

For the adherence analysis, a descriptive statistical analysis was conducted by analysing absolute (n) and relative (percentage) frequencies for qualitative variables and the mean \pm standard deviation (SD) or median \pm interquartile range [IQR], depending on whether they adjusted

to normality for quantitative variables. The parametric behaviour of the variables was assessed using the Kolmogorov Smirnov test. For contrast hypotheses of quantitative variables we used the Kruskal Wallis non-parametric tests and the Spearman correlation and Chi square test for qualitative variables. A linear regression analysis was performed to establish the impact that the different variables studied had on adherence (PDC) and a correlation analysis was performed between the Morisky Green Levine test and the PDC. A statistical significance level of 95% was used.

Ethical considerations

The study was conducted in accordance with the good clinical practice guidelines of the Declaration of Helsinki and was approved by the Ethical Committee for Clinical Research of the Puerta de Hierro Majadahonda University Hospital located in the Autonomous Community of Madrid. (protocol code ABG-ENA-2019-01)

RESULTS

300 patients were recruited, 10 of whom did not meet the inclusion criteria and were not included in the analysis. The sociodemographic data of the 290 patients is shown in **Table 1**.

Table 1 Sociodemographic data

| | | n | % | CI |
|-------------------|-----------------------------|-----|------|-------------|
| Gender | Male | 109 | 37.6 | 31.99-43.44 |
| | Female | 181 | 62.4 | 56.56-68.01 |
| Country of origin | Colombia | 1 | 0.3 | 0.01-1.91 |
| | Spain | 282 | 97.2 | 94.64-98.80 |
| | Gambia | 1 | 0.3 | 0.01-1.91 |
| | Peru | 1 | 0.3 | 0.01-1.91 |
| | Romania | 4 | 1.4 | 0.38-3.49 |
| | Uruguay | 1 | 0.3 | 0.01-1.91 |
| Level of studies | Primary/Secondary | 148 | 51.0 | 45.12-56.92 |
| | Vocational/Pre-University | 89 | 30.7 | 25.43-36.35 |
| | No studies | 18 | 6.2 | 3.72-9.63 |
| | Academic | 35 | 12.1 | 8.55-16.38 |
| Family situation | Residing with friends | 4 | 1.4 | 0.38-3.49 |
| | Residing with children | 20 | 6.9 | 4.26-10.45 |
| | Residing with parents | 14 | 4.8 | 2.66-7.97 |
| | Residing with partner | 144 | 49.7 | 43.76-55.56 |
| | Couple with children | 59 | 20.3 | 15.86-25.44 |
| | Alone | 49 | 16.9 | 12.77-21.72 |
| Labour situation | Employed | 58 | 20.0 | 15.55-25.07 |
| | Domestic worker | 36 | 12.4 | 8.85-16.77 |
| | Low employment / Disability | 6 | 2.1 | 0.76-4.45 |
| | Student | 2 | 0.7 | 0.08-2.47 |
| | Retired | 179 | 61.7 | 55.86-67.35 |
| | Unemployed | 9 | 3.1 | 1.43-5.81 |

Only 74 patients (25.5%; [95%CI: 20.6:30.9]) met the criteria for polymedicated patients described in the study protocol. Nevertheless, the median number of prescribed treatments was 4 (IQR: 2–6) and the median number of different prescribed therapeutic groups was also 4 (IQR: 2–5).

The prescriptions were made mainly by INN. Of the total of 1194 prescriptions analysed, 667 (55.9%; [95%CI: 53.0:58.6]) were made based on active ingredient, 455 (38.1%, [95%CI: 35.3:40.9]) by the brand name of the drug, and only 72 (6.0%, [95%CI: 4.8:7.5]) were prescriptions for generic pharmaceuticals.

Regarding dosage, the simplest administration guidelines (those of a daily administration) accounted for the largest number of prescriptions up to 75.5% (Table 2).

Table 2 Frequency of the different dose regimes

| | Dose | n (%) |
|---|---------------|------------|
| A | (1-0-0-0) | 549 (46.0) |
| B | (1-0-1-0) | 187 (15.7) |
| D | (0-0-1-0) | 181 (15.2) |
| K | (0-1-0-0) | 94 (7.9) |
| C | (0-0-0-1) | 77 (6.4) |
| J | (1-1-1-0) | 29 (2.4) |
| F | (1 per month) | 23 (1.9) |
| E | (2-0-0-0) | 22 (1.8) |

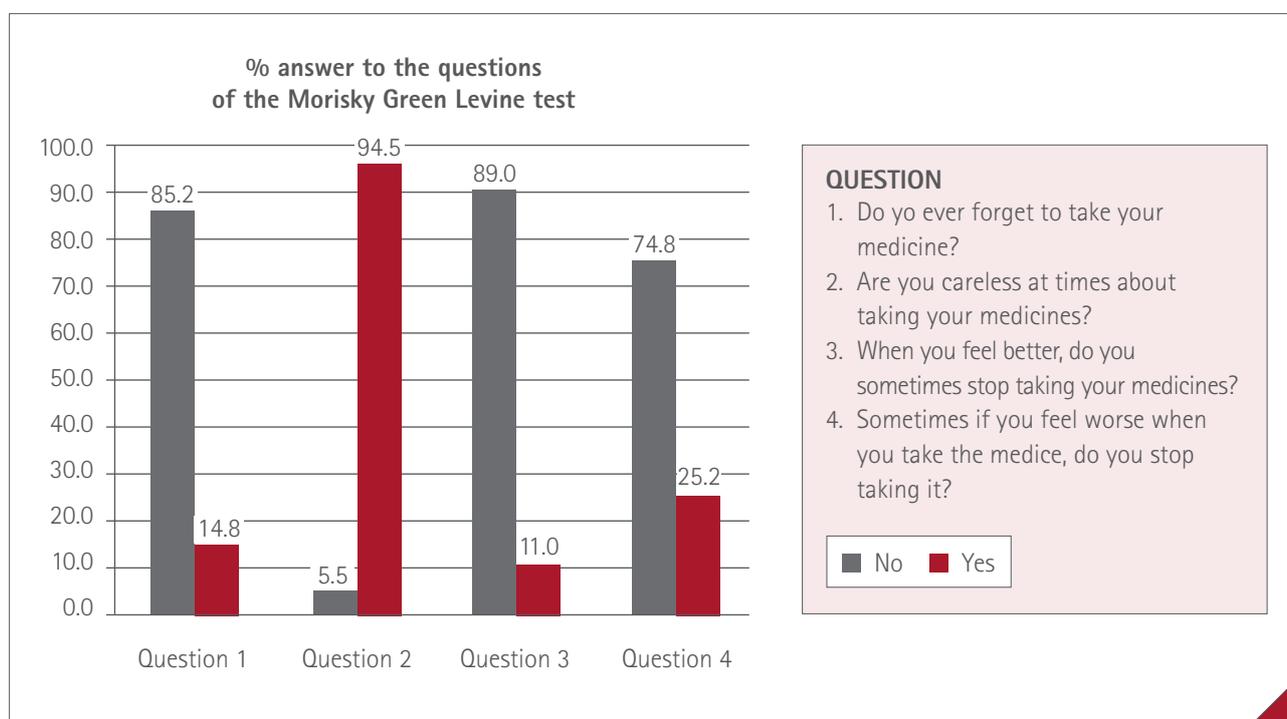


Figure 1 Responses to Morisky Green Levine test questions (n=290 patients)

Adherence

The median PDC per patient was 0.90 (IQR: 0.73 - 1). The PDC by treatment had a median of 1 (IQR: 0.73 - 1). According to the abbreviated Morisky Green Levine questionnaire, 168 patients (57.9%; [95%CI 52.0:63.6]) adhered to their treatments. Figure 1 shows the responses to the four Morisky Green Levine test questions.

Correlation between the Morisky Green Levine test and the PDC was low (Chi square test; p=0.134) with a kappa k=0.086. 56.9% of the patients expressed agreement in their responses regarding adherence (41.4% were adherents in both methods and 15.5% were non-adherents) and 43.1% expressed disagreement.

Patient adherence as per PDC

The impact of some variables on adherence measured by the Proportion of Days Covered rate was evaluated (Table 3).

The level of Vocational Training/higher studies, whether there are children in the family and the labour situation in terms of sick leave/disability, correlated significantly with the PDC. There was a statistically significant correlation between adherence as per total PDC and as measured by the Morisky Green Levine questionnaire (Mann Whitney U test; p=0.039). Patients who were adherent according to Morisky Green Levine also had higher total PDC scores (Median=0.92, IQR=0.24-1) compared to non-adherent

Table 3 Analysis of how the PDC is impacted by the qualitative variables of study patients. Cases with a statistically significant relationship have been marked with (*)

| | | Median PDC | p | |
|------------------------|---------------------------|------------|-----------|-------|
| Gender | Male | 0.92 | 0.51 | |
| | Female | 0.90 | | |
| Level of studies | Primary/secondary | 0.89 | 0.21 | 0.082 |
| | Vocational/pre-university | 0.96 | 0.014 (*) | |
| | No studies | 0.93 | 0.88 | |
| | Academic | 0.84 | 0.16 | |
| Family situation | Residing with friends | 0.98 | 0.14 | 0.098 |
| | Residing with children | 1.00 | 0.027 (*) | |
| | Residing with parents | 0.77 | 0.25 | |
| | Residing with partner | 0.89 | 0.49 | |
| | Couple with children | 0.90 | 0.34 | |
| | Alone | 0.94 | 0.51 | |
| Labour situation | Employed | 0.90 | 0.44 | 0.277 |
| | Housewife | 0.85 | 0.31 | |
| | Sick leave / disabled | 1.00 | 0.031 (*) | |
| | Student | 0.82 | 0.98 | |
| | Retired | 0.91 | 0.62 | |
| | Unemployed | 0.96 | 0.59 | |
| Morisky Green Levine | No | 0.88 | 0.039 (*) | |
| | Yes | 0.92 | | |
| PHQ-2 | Negative | 0.89 | 0.118 | |
| | Positive | 0.93 | | |
| Takes anti-depressants | No | 0.89 | 0.003 (*) | |
| | Yes | 0.99 | | |
| Takes anxiolytics | No | 0.90 | 0.291 | |
| | Yes | 0.91 | | |
| Polymedicated patient | No | 0.90 | 0.247 | |
| | Yes | 0.91 | | |

*p <0.05.

The median PDC and its statistical significance with each of the qualitative variables collected in the study are described.

patients according to Morisky Green Levine (Median=0.88, IQR=0.30-1). The PDC score and the taking of antidepressant drugs had also showed a significant correlation (Mann Whitney U test, p=0.003); patients receiving antidepressant treatments being more adherent. Patients who used antidepressant drugs scored an average of 0.99 on the total PDC (IQR=0.13-1) compared to those who did not take antidepressant drugs (PDC: Median=0.89, IQR=0, 30-1).

A correlation analysis of total PDC was performed using patients' quantitative variables: age, number of long-term treatments, number of therapeutic groups and number of prescriptions by INN, generic or brand name drugs. A statistically significant correlation was observed between adherence measured by patients' total PDC and the number of long-term treatments prescribed for the patient (Spearman's Rho correlation 0.12, p=0.049) and the number of

therapeutic groups (Rho correlation of Spearman 0.12, p=0.038), **Figure 2**.

A simple and multiple linear regression analysis was performed to evaluate the impact of the different variables on PDC. The simple linear regression analysis showed that living with children and having completed vocational/higher studies were the sociodemographic variables with a positive impact on PDC. The number of long-term treatments, the number of prescribed therapeutic groups, taking antidepressant drugs and the number of prescriptions containing active ingredients also had a positive statistically significant impact on adherence.

Multiple regression analysis showed that taking antidepressants, together with the number of long-term treatments or number of therapeutic groups, accounts for a rise in the PDC (**Table 4**).

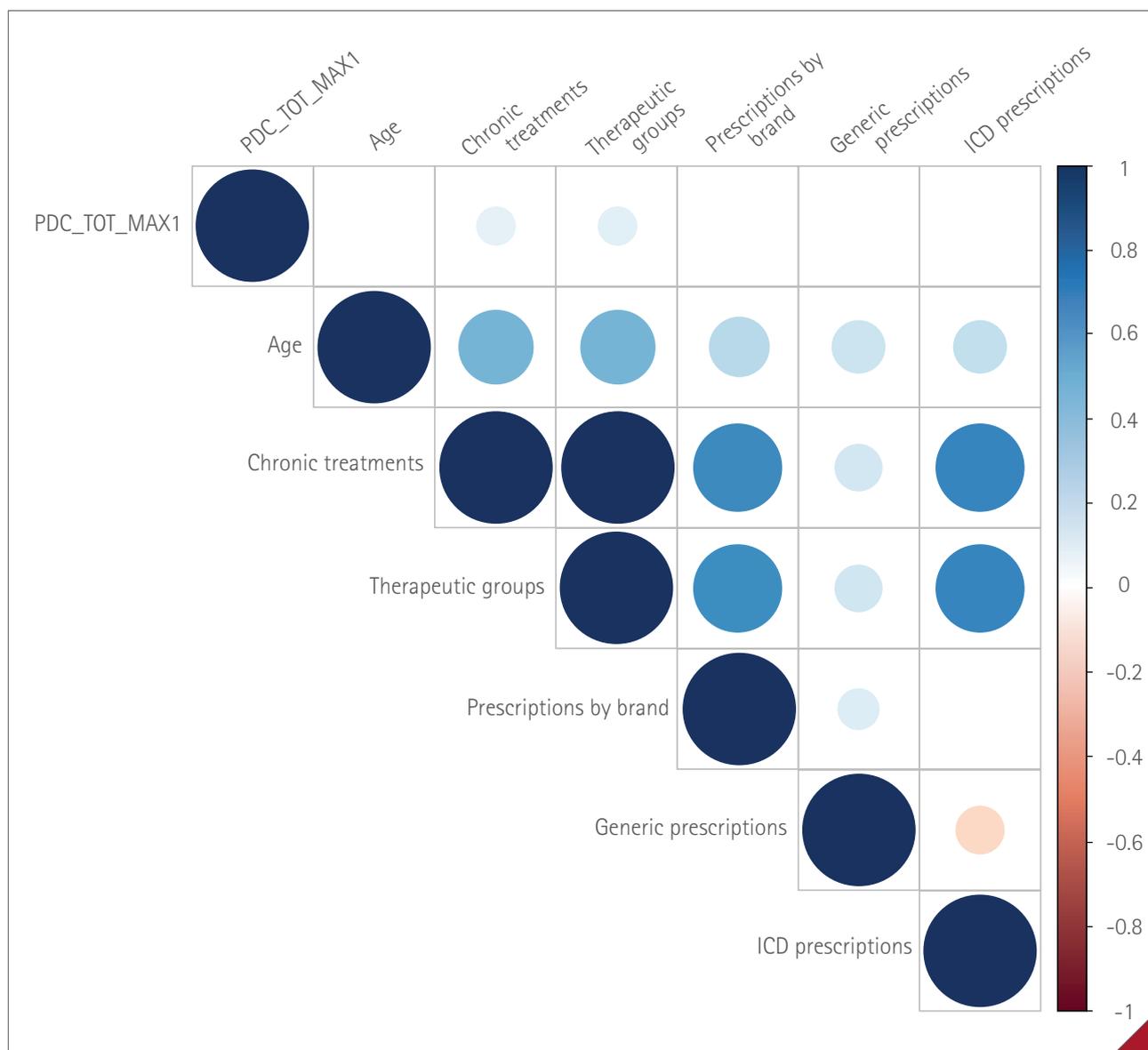


Figure 2 Spearman's correlation of patient quantitative variables and the PDC
 The figure shows graphically the Spearman correlation indexes between the PDC and the different quantitative variables related to the patient. The higher the correlation index, the larger the size of the circle.

Table 4 Multiple regression analysis of PDC per patient

| | | B (CI 95%) | *p | R ² |
|---------|--------------------------------------|---------------------|--------|----------------|
| Model 1 | Takes antidepressants | 0.085 (0.019-0.151) | 0.012 | 0.068 |
| | No. of treatments prescribed | 0.016 (0.07-0.025) | <0.001 | |
| Model 2 | Takes antidepressants | 0.086 (0.020-0.152) | 0.011 | 0.071 |
| | No. of therapeutic groups prescribed | 0.017 (0.08-0.022) | <0.001 | |

CI: confidence interval; *p <0.05.

Multiple regression analysis evaluates the influence that different patient characteristics have on the PDC. B indicates the change that one unit of the variable considered would produce on the PDC. R² shows the goodness of fit

PDC and Patient treatments

The hypotheses contrast of the PDC with the treatment variables (type of presentation, dosage, form and therapeutic group) confirmed a statistically significant relationship between adherence to treatment as measured by the PDC, and the posology and therapeutic group of the prescribed drugs (Kruskal-Wallis test, $p < 0.001$ in both cases).

Patients adhered more strictly to single dose per day or one dose per month treatments, and adhered less to treatments with a dose of 1-1-1-0, median PDC per treatment of 0.48 (IQR = 0.62). Figure 3 shows the comparison between the different adherence rates with respect to dosage regimes, while Figure 4 shows the frequency of the different dosage regimes.

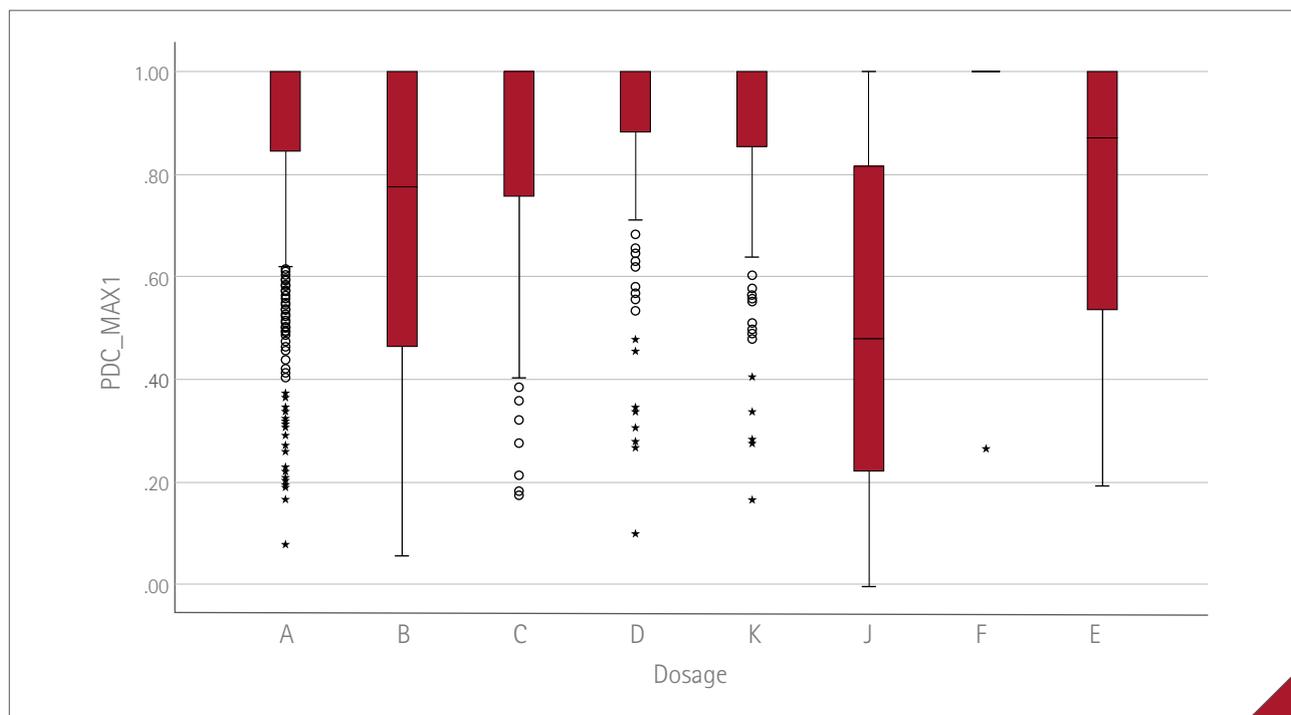


Figure 3 Adherence rates (Me) related to dose regime

The table shows the relationship between the PDC and the different dosing regimens of the treatments received by the patients, expressed as median and IQR. PDC MAX1: a maximum PDC value of 1 was considered for statistical analysis. For statistical analysis purposes, values over 1 were transformed into 1 as patients cannot be over 100% adherent.

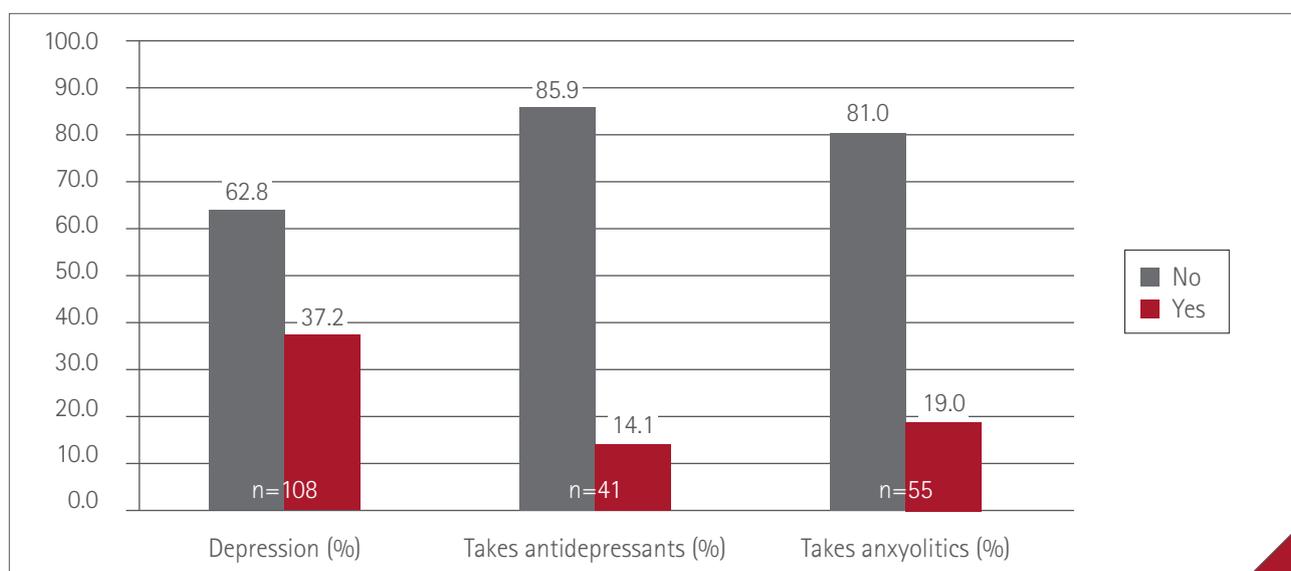


Figure 4 Mental Health: depression and anxiety

The prevalence of depression in the sample according to the PHQ-2 questionnaire and the consumption of antidepressant and anxiolytic drugs expressed in absolute frequencies can be observed.

Mental Health

Screening by means of the ultra-short PHQ-2 questionnaire showed that 108 patients (37.2%; CI: 31.6-43.0) suffered from depression, 41 patients of them (14.1%; CI: 10.3-18.6) used antidepressant drugs but more than 62% of the patients suffering from depression were not receiving treatment for their illness. In addition, 55 patients (19.0% CI: 14.6-23.9) took anxiolytics, as shown in Figure 5.

A statistically significant correlation was found between depression and gender (Chi square test, $p=0.002$), 80 women (44%, CI: 36.8-51.7) suffered from depression compared to 28 men (26%, CI: 17.8-34.9). Likewise, a statistically significant correlation was found between depression and whether or not a patient was polymedicated (Chi-square test, $p = 0.019$).

DISCUSSION

In Spain, no specific training is given to pharmacists regarding adherence. Moreover, there are no specific government policies addressing adherence (13). However, pharmacists play a key role in increasing adherence and their intervention through different professional pharmaceutical care services offered at the community pharmacy level (medication review and follow up, individualized dosing systems, etc) may help to increase adherence to long term treatment.

However, consensus regarding the effectiveness of adherence interventions is lacking (14,15) and further research is needed to determine what interventions are cost effective and identify the health professional that should carry them out.

The main objective of the study was to analyse adherence to long-term treatments prescribed to patients through the electronic prescription scheme. The PDC is able to measure adherence per patient, per population group, per treatment and per therapeutic group being more conservative than other ratios when estimating adherence by therapeutic group when there is a tendency to switch between treatments or when the patient simultaneously takes several drugs from the same therapeutic group (9)

In addition to the PDC, the study evaluated adherence using the Morisky Green Levine test. In both cases, the adherence rate (57.9% and 90.8% respectively) was higher than that observed by other authors in Spain using the Morisky Green Levine test (11,12,16,17). However, in a study more similar to our study in terms of the methodology and variables analysed, adherence rates similar to ours were obtained. The patients in that study, as in ours, were elderly (over 70), 42% had five or more chronic diseases and were being treated with six or more therapeutic groups. These patients resided in a nursing home and may have their medication administered which may increase adherence. Although this latter observation is not stipulated in the article, this is common practice in nursing homes and health facilities (18).

Today there are a number of tools available to assess patient adherence but there is no consensus regarding which one should be used as the standard in scientific practice (19), which means that comparisons between studies should be made with caution (20) and make some authors stress the need to use several measurement methods simultaneously to avoid overestimations (21).

The correlation analysis between the Morisky Green Levine test and the PDC test yielded poor results, indicating that these two tests could not be compared, were not interchangeable and evaluated different aspects of adherence thus making them complementary. However, more research is needed to define which aspects each of these two tools covers in order to identify which is more appropriate to use as a standard measure. However, hypothesis testing found a statistically significant relationship between self-reported adherence by patients and adherence evaluated with the electronic prescription through the PDC, which was one of the main objectives of the study.

Some authors have found it very difficult to estimate adherence with the electronic prescription. The study by Prats et al. reported that as many as 19.0% of electronic prescriptions were rejected due to discrepancies between what was prescribed and what the patient thought was prescribed and 32.3% of rejections due to various causes related to non-compliance (forgetfulness, economic reasons, adverse reactions,...). The authors concluded that unless we identify the reasons why patients fail to fill their prescriptions at the pharmacy, it will be very difficult to determine adherence or lack thereof using e-prescriptions (22). The scientific community recognizes that the fact that patients collect their medication from the pharmacy does not necessarily mean that they take it, but also recognizes that failure to collect medicines dispensed by e-prescription could be indicative of failures in primary adherence and are one of the factors driving down adherence rates.

Multiple regression analysis provided a model with similarities to some national studies, such as that of Fernández Lisón (in both cases the number of treatments received by the patient has a positive impact on adherence) (12). However, it also shows differences with other studies that associate adherence with the number of pharmacies to which the patient goes for his or her medication (which would be a measure of loyalty to the community pharmacy) or with the dosing regimen of the medication (17).

The positive correlation between adherence and number of treatments and the number of prescribed therapeutic groups (which turned out to be identical) is contrary to what has been described by some authors (23) who consider that polytherapy drives up non-compliance, especially among elderly patients. Perhaps patients with a greater number of treatments are more aware of their deteriorating health, are also more organized and know that at each meal they have to take some medication and therefore do not forget. More studies are needed to test these hypotheses.

Adherence analysis based on patients' variables becomes very complex and the data from the study vary significantly when compared to those of other national studies with similar samples and designs. This variability seems to confirm Vrijens' view that adherence has a multifactorial component and that, furthermore, there is an unintended component that neither the patient, nor the clinician, nor the researcher can control, which would explain the great diversity of results from one study to another (3). This diversity makes it much more difficult to target adherence interventions to obtain optimal results.

Regarding treatment variables, we analysed the presentation in which patients received their prescribed medication: as an active ingredient, as a generic drug or as a brand name medicine. Contrary to what has been described (24,25), our study did not find any correlation between these factors and adherence.

We have not found any studies that have evaluated whether the prescribed therapeutic group impacts adherence, which is why this was one of our objectives. In our study, therapeutic group N02 corresponding to analgesic drugs was the one with the lowest adherence rate. Perhaps this is due to what one could consider a "prescription habit" on the part of physicians, who prescribe analgesic drugs for chronic diseases or "on demand" that patients then do not collect at the pharmacy and would only consume when symptoms occur. Some authors consider this a "good criterion" for the physician insofar as it makes medication available to patients as needed to address symptoms (22). However, it can also lead to abuse in the consumption of pharmaceuticals and use of health system resources.

Lastly, the ratio of study patients with mental illness was higher than in the general population (26,27). We would also note, however, that patient recruitment took place during the first wave of the pandemic and recent studies have shown a significant increase in symptoms of depression during SARS-COV-19, patients with previous depression have worsened and anxiety, sleep disorders, and other psychological diseases have increased (28). Hence, our study data more closely reflects the situation of patients affected by the pandemic than the Spanish population prior to COVID-19.

This study has some limitations. First of all, it was conducted at one single pharmacy which could mean that the sample is not as representative as it should be or is not a true reflection of the overall population of the Community of Madrid. The study has been performed during the COVID-19 pandemic and the number of patients recruited was influenced by this fact and the study design did not take into account the possibility of switching between drugs of the same therapeutic group which could interfere with the measurement of adherence.

CONCLUSION

The electronic prescription turned out to be a useful tool to gain insight into how strictly the population adheres to their long-term treatments measured with the PDC.

Although the relationship found between the Morisky Green Levine test and the PDC was low, both tools can be useful for measuring adherence since each one measure different aspects of adherence.

The adherence results obtained using the different variables analysed reveal the complexity of the comprehensive approach to adherence in a community pharmacy setting and that patients need to be approached in a holistic fashion in order to improve adherence.

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APPENDIX

REACT STUDY

Electronic prescription, Adherence and Therapeutic Compliance

Observational study to assess adherence to treatment in the population through Electronic Prescription in a Pharmacy Office in the Autonomous Community of Madrid.

Sponsor: Amparo Bonilla Guijarro – Pharmacy Office

INCLUSION CRITERIA

Inclusion criteria:

- | | | |
|---|-----|----|
| 1. Patient over 18 years old | YES | NO |
| 2. Patient included in electronic prescription for at least the last 12 months | YES | NO |
| 3. Patient with chronic treatments prescribed in electronic prescription | YES | NO |
| 4. Patient with no functional or cognitive impairment that prevents him/her from optimal medication management and providing the required information appropriately for the study | YES | NO |
| 5. Patient who understands and voluntarily signs the informed consent and guarantor document of the Organic Law 3/2018 of 5 December 2018 on the Protection of Personal Data and Guarantee of Digital Rights before the start of the study. | YES | NO |

Exclusion criteria:

- | | | |
|--|-----|----|
| 1. Patients being treated with drugs for dementia, cognitive impairment of NO6D groups (nervous system, psychoanaleptics, anti-dementia drugs: Donepezil, Galantamine, Memantine, Rivastigmine and Ginkgo), as an indicator of incapacity. | YES | NO |
| 2. Patients who do not meet the inclusion criteria | YES | NO |

If the answer to the inclusion criteria is AFFIRMATIVE and the answer to the exclusion criteria is NEGATIVE, the patient is eligible to participate in the study.

SOCIODEMOGRAPHIC DATA

Date of birth:

Age:

Gender: Male

/

Female

| Country of origin | | Level of studies | |
|-------------------------|--|-----------------------------|--|
| Spain | | No studies | |
| Other (enter) | | Primary / Secondary | |
| | | Vocational / Pre-University | |
| | | Academic | |
| Family situation | | Labour situation | |
| Alone | | Employed | |
| Residing with partner | | Unemployed | |
| Couple with children | | Retired | |
| Residing with children | | Domestic worker | |
| Residing with caregiver | | Low employment / Disability | |
| Residing with parents | | Student | |
| Residing with friends | | | |

MORISKY GREEN LEVINE TEST

The investigator will ask the following four questions interspersed with the conversation, in a cordial, non-inquisitive manner:

| | YES | NO |
|--|-----|----|
| Do you ever forget to take your medicine? | | |
| Are you careless at times about taking your medicines? | | |
| When you feel better, do you sometimes stop taking your medicines? | | |
| Sometimes if you feel worse when you take the medicine, do you stop taking it? | | |
| COMPLIANT? | | |

The patient is considered compliant if he/she answers all four questions correctly, i.e. NO/YES/NO/NO..

PHQ-2: Ultrashort instrument for depression screening

| | YES | NO |
|---|-----|----|
| During the past month have you been worried about feeling low in mood, depressed or hopeless? | | |
| During the past month have you been concerned about low interest or diminished pleasure in your activities? | | |
| PATIENT WITH DEPRESSION | | |

ELECTRONIC PRESCRIPTION DATA

Number of prescribed treatments:

Number of therapeutic groups:

Of all the treatments prescribed:

- How many of them are brand name pharmaceutical?
- How many of them are generic drugs?
- How many of them are prescribed by international non-proprietary name (INN)?

| Active Ingredient | Therapeutic group | Dose | Presentation | Sort of prescription | Pharmaceutical form | Treatment duration | | Date of first dispensation | Posology | Periods covered | Number of packs dispensed in 12 months | Number of days with medication | PDC |
|-------------------|-------------------|--------|--------------|----------------------|---------------------|--------------------|----------|----------------------------|----------|-----------------|--|--------------------------------|-----|
| Enalapril | C09AA | 20 mg | 28 pills | PA | Pill | CRONIC | | | 1 0 0 0 | 28 days | 12 | 784 | |
| Enalapril | C09AA | 20 mg | 60 pills | EFG | Pill | CRONIC | | | 1 0 0 0 | 60 days | 5 | 300 | |
| Naproxen | M01AE | 550 mg | 28 pills | MARCA | Pill | ACUTE | 2 months | | 1 1 1 0 | 9.3 days | 1 | 9.3 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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