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# Prescribing habits of Moroccan psychiatrists toward patients with schizophrenia: about 72 practitioners

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## Abstract

**Background** The therapeutic decision toward patients with schizophrenia is very different from one psychiatrist to another when faced with potentially similar clinical symptoms. It depends on many factors that are related to the patient's and the doctor's profiles, and the drug's characteristics. To date, no study has been conducted in Morocco on the prescribing habits of psychiatrists toward patients with schizophrenia. The objectives of our survey are to identify the molecules most prescribed by psychiatrists in Morocco for patients with schizophrenia and to determine the most common therapeutic strategies.

**Results** Our survey recruited 72 Moroccan psychiatrists. The median age was 36.5 years. 72.2% were women, and 37.5% had between 5 and 10 years of practice. More than two-thirds were practicing in the public sector in big cities. Olanzapine was an antipsychotic prescribed as first-line treatment for a patient with schizophrenia. For the majority, the most frequent combination was atypical antipsychotics with conventional neuroleptics. On the one hand, most psychiatrists reported prescribing neuroleptics long-acting injectable (neuroleptic LAIs). In the other hand, almost half of the participants had never prescribed second-generation antipsychotic long-acting injectables (SGA-LAIs). The high cost (77.8%), lack of availability of the product in certain sectors (33.3%), lack of therapeutic choice (26.4%), and lack of patient profile that could use the drug (23.6%), were among the strong reasons given for not prescribing SGA-LAIs.

**Conclusions** The treatment decision for patients with schizophrenia differs from one clinician to the other. It depends on various factors that may be related to the psychiatrist, the patient, and to the drug.

**Keywords** Prescribing habits, Moroccan psychiatrist, Schizophrenia, Long-acting injectable, Second generation antipsychotic

## Background

The worldwide prevalence of mental illness is clearly increasing [1]. According to recent data from the World Health Organization, schizophrenia affected

approximately 24 million people or 1 in 300 people (0.32%) worldwide [2]. This disabling psychotic disorder is a public health problem that is frequently associated with significant distress and impairment for the patient, his family, and for society [3]. In 2015, Africa lost 17.9 million years of disability due to mental disorders [4]. Current guidelines for treating patient with schizophrenia focus in improving quality of life and maximizing adaptive functioning [5]. Therefore, a recovery-oriented approach was advocated to encourage active collaboration between patients, carers and mental health

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professionals in order to design and manage a customized and integrated care plan [5, 6].

The therapeutic decision when faced with a patient with schizophrenia cannot be based on symptomatic considerations only; it requires a good clinical diagnosis, with a precise evaluation of the patient’s psychological, cognitive, relational, and affective situation, but also a true consideration of the quality of therapeutic compliance and the therapeutic alliance [7]. Nonadherence to the treatment is one of the major reasons for the relapse and worsening of the disease. Psychiatrists tried to identify and address poor adherence to antipsychotic medication, to avoid its consequences (aggressive behavior, suicide, substance abuse, relapse, hospitalization) [8, 9].

However, the diversity of psychotropic drugs (antipsychotics, antidepressants, thymoregulators, anxiolytics, and hypnotics) in psychiatric practice and the complexity of prescribing (therapeutic beneficial and side effects, drug interactions, and contraindications), mean that psychiatrists may have many therapeutic attitudes [10]. Thus, therapeutic decisions, very different from one to other doctor, would be observed toward potentially similar clinical pictures. To date, no study has been conducted in Morocco on the prescribing habits of psychiatrists toward patients with schizophrenia. The objectives of our survey were to identify the molecules most prescribed by psychiatrists in Morocco for schizophrenia and to determine the most common therapeutic strategies.

**Methods**

We conducted a cross-sectional descriptive study using an online anonymous questionnaire on Google Forms. This questionnaire was distributed individually and in groups representing the psychiatric community in Morocco via social networks (Gmail, WhatsApp and Facebook) targeting 256 psychiatrists. It was divided into two parts. The first part was related to socio-demographic data (old, sex, years of practice, sector of practice) and the second one concerned data related to prescribing habits toward patients with schizophrenia. They were binary questions (yes, no) and ones with single choice or multiple choices among several suggestions. A Likert scale with 5 options (never, rarely “once a month”, occasionally “once a week”, often “two to three times a week” and always) was used to estimate the frequency of combination therapy with antipsychotics and the frequency of prescribing long-acting injectable antipsychotics (LAIs).

The duration of the study was limited to one month. Nearly all answers were obtained in the first two weeks of the study’s start-up, and no responses were added despite repeated requests within a month. Psychiatrists (in training and specialists) were included and practitioners of all other medical specialties were excluded. All participants

expressed their consent to participate in the study after reading the interest and aim of the study. They agreed to take part in the questionnaire, and in case of non-acceptance, the following questions were not opened. Data were transcribed on JAMOVI and interpreted by the same application. The qualitative variables were expressed as headcount (*n*) and percentage (%) and the quantitative variables as median and percentile [ $\frac{1}{4}$ ,  $\frac{3}{4}$ ] (for variable with asymmetric and inhomogeneous distribution).

**Results**

Our survey recruited 72 participants among 256 psychiatrists solicited. The median age was 36.5 years. 72.2% were women. 37.5% had between 5 and 10 years of practice. 86.1% worked in the public sector and 76.4% were in a big city with a university hospital (Table 1).

Olanzapine was the first-line antipsychotic prescribed for a patient with schizophrenia (45.8%) followed by risperidone (38.9%). This therapeutic molecule was also the most commonly prescribed drug for patients with schizophrenia in 55% of cases, followed by risperidone (27.5%) and conventional neuroleptics in third place (11.5%). Only 9.7% of the psychiatrists said that they had never prescribed combination therapies in a first prescription, whereas 37.5% of them did so often (two to three times a week) and 19.4% rarely (once a month). For most of our participants, the most frequent combination was that of atypical antipsychotics with conventional neuroleptics

**Table 1** Socio-demographic characteristics of participants

Characteristics	Participants (N= 72) n (%) <sup>a</sup> /median [ ] <sup>b</sup>
<b>Old</b>	36,5 ans [32,40]
<b>Gender</b>	
Man	20 (27.8)
Woman	<b>52 (72.2)</b>
<b>Sector of practice</b>	
Public	<b>62 (86.1)</b>
Private	10 (13.9)
<b>City of practice</b>	
Big city with university hospital	<b>55 (76.4)</b>
Another city	17 (23.6)
<b>Years of practice</b>	
< 5 years	26 (36.1)
Between 5 and 10 years	<b>27 (37.5)</b>
Between 11 and 20 years	17 (23.6)
> 20 years	2(2.8)

<sup>a</sup> Qualitative variable expressed as number and percentage

<sup>b</sup> Old expressed as median and percentile [ $\frac{1}{4}$ ,  $\frac{3}{4}$ ]; Entries in boldface significate the highest value

(61.1%), followed by atypical antipsychotics with anxiolytics (26.4%).

As for the prescription of neuroleptics long-acting injectable, 83.1% of psychiatrists reported prescribing them (with varying frequencies: often by 13.9% of clinicians, occasionally by 40.3% and rarely by 38.9% of them) while 51.4% had never prescribed second-generation antipsychotic long-acting injectables (Table 2).

Among the main reasons considered before prescribing an antipsychotic drug, reported by our participants, they were the efficacy of the product (69.4%), the side effects (45.8%), the cost of the product (43.1%), and the quality of compliance (40.3%). The main reasons given for not prescribing SGA-LAIs, they were high cost (77.8%), lack of availability of the product in some sectors (33.3%), lack of therapeutic choice (26.4%) and lack of a patient profile that could use the drug (23.6%) (Figs. 1 and 2).

### Discussion

Our survey had recruited 72 participants among 256 psychiatrists solicited. The profile of our practitioner was that of a young woman, aged 36, with less than 10 years of practice and working in the public sector in a big city with a university hospital (Table 1).

This sample is fairly representative. Despite the wide spread of mental disorders, Morocco is facing a lack of mental health professionals. According to data on the situation of healthcare supply for 2021, the country has only 500 psychiatrists, almost half of them practicing in the private sector [11, 12]. Data, related to the clinician, justify the results obtained in terms of the choice of molecule and therapeutic strategy (Table 2). According to the study by Hamann et al., doctors tended to stick to the treatments they knew best or with which they became familiar during their training [13].

Previous studies had shown that antipsychotics were the most prescribed psychotropic drugs, represented mainly by conventional neuroleptics, followed by anxiolytics and antidepressants [14, 15]. From the 2000s onward, the use of atypical antipsychotics had dominated prescriptions in hospitals [16]. A Spanish study conducted in 2017 concluded that risperidone and paliperidone were the most prescribed antipsychotics regardless of their dosage form [17]. Quetiapine, aripiprazole, and olanzapine also accounted for a significant proportion [17]. Several studies had provided evidence of olanzapine's efficacy in schizophrenia treatment [18, 19]. In a meta-analysis that involved 212 randomized studies of 15 different first- and second-generation antipsychotics [20], the Olanzapine was among 4 effective antipsychotics (with clozapine, amisulpride, and risperidone)

**Table 2** The prescribing habits of the participants for a patient with schizophrenia

	Number of participants <i>N</i> = 72 <i>n</i> (%) <sup>a</sup>
<b>Antipsychotic prescribed as first-line treatment</b>	
Olanzapine	<b>33 (45.8)</b>
Risperidone	28 (38.9)
Amisulpride	5 (6.2)
Aripiprazole	2 (2.8)
Quetiapine	0 (0)
Conventional neuroleptic	2 (2.8)
No option	2 (2.80)
<b>Antipsychotic drug usually prescribed</b>	
Olanzapine	<b>38 (55)</b>
Risperidone	19 (27.5)
Amisulpride	5 (7.2)
Aripiprazole	2 (2.8)
Quetiapine	0 (0)
Conventional neuroleptic	8 (11.5)
No option	0 (0)
<b>Frequency of combination therapies in a 1st prescription</b>	
Never	7 (9.7)
Rarely (once a month)	19 (26.4)
Occasionally (once a week)	14 (19.4)
Often (twice to thrice a week)	<b>27 (37.5)</b>
Always	5 (6.9)
<b>Frequency of psychotropic drug combinations</b>	
Atypical antipsychotic + neuroleptic	<b>44 (61.1)</b>
Atypical antipsychotic + anxiolytic	19 (26.4)
Atypical antipsychotic + thymorégulator	4 (5.6)
Atypical antipsychotic + antidepressant	1 (1.4)
Atypical antipsychotic + hypnotic	1 (1.4)
Two atypical antipsychotics	1 (1.4)
Two neuroleptics	2 (2.8)
<b>Frequency of prescribing of neuroleptics long-acting (neuroleptics-LAIs)</b>	
Never	5 (6.9)
Rarely (once a month)	28 (38.9)
Occasionally (once a week)	<b>29 (40.3)</b>
Often (twice to thrice a week)	10 (13.9)
Always	0 (0)
<b>Frequency of prescribing of second-generation antipsychotic long-acting injectables (SGA-LAIs)</b>	
Never	<b>37 (51.4)</b>
Rarely (once a month)	33 (45.8)
Occasionally (once a week)	2 (2.8)
Often (twice to thrice a week)	0 (0)
Always	0 (0)

LAIs Long-acting injectable, SGA Second generation antipsychotic

<sup>a</sup> Qualitative variable expressed as number and percentage; Entries in boldface significate the highest value.

### The main reasons for not prescribing Long Acting Injectable neuroleptics-LAIs / SGA-LAIs in Morocco in (%)

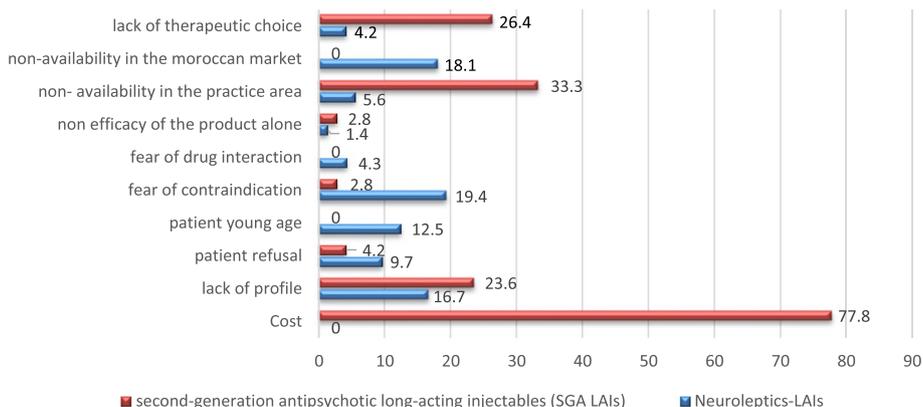


Fig. 1 Comparison of the main reasons for not prescribing antipsychotics long-acting injectable (neuroleptics-LAIs vs SGA LAIs)

### The main factors considered before prescribing an antipsychotic drug



Fig. 2 The main factors considered before prescribing an antipsychotic drug according to our participants

on improvements in the Positive and Negative Syndrome Scale (PANSS) scores, and among 5 antipsychotics (with amisulpride, clozapine, paliperidone, and risperidone) associated with lower rates of nonadherence [20]. Our results agreed with recent studies where olanzapine and risperidone are prescribed in the majority of cases either as first-line or background treatment for schizophrenia. This latter finding is hypothesized to be related to the development of improved insight during olanzapine treatment and the downstream effects [21, 22].

Despite the introduction of new molecules, many studies had found that psychiatrists tended to poly prescribe psychotropic drugs [16]. Anxiolytics were the most frequently prescribed molecules in the context of psychotropic drug combinations [17]. Also, the combination of

two or more antipsychotics was frequent [10]. A recent study on the pattern of prescription of antipsychotics in Qatar focusing on polypharmacy identified about 30% of the studied received at least two antipsychotics concomitantly [23]. In our study, only 9.7% of our participants confirmed their adherence to monotherapy in a first prescription for a patient with schizophrenia, whereas 37.5% stated that combinations of psychotropic drugs were often in the foreground and that the most frequent combination was atypical antipsychotics with conventional neuroleptics followed by atypical antipsychotics with anxiolytics. This finding was similar to the data reported in the literature where an efficacy in favor of antipsychotics combination therapy was proved [24–26]. Landmark et al. 1994, found that the combined treatment significantly

shortened the length of hospital stay also obtained significantly higher improvement ratings quickly than the single treatment patients [27]. However, most of the evidence for the use of antipsychotic combinations comes from short-term trials, which limits the assessment of long-term efficacy and safety [28].

Long-acting injectable antipsychotics medication were not widely used in daily practice with a rate of less than 30% in many countries [16]. In our sample, more than half of the practitioners reported never having prescribed SGA-LAIs, while 93% had prescribed neuroleptics LAIs (Table 2). Like their oral forms, LAI offered control of acute positive and negative symptoms of schizophrenia and stabilization of episodes over time [6]. However, by the end of the 1990s, patient prognosis was largely determined by the control of negative and cognitive symptoms, which were only weakly controlled by these drugs. Additionally, the side effects of neuroleptics LAIs (the same as those administered per os) led to the development of SGA-LAIs in the 2000s. They were formulated from second generation atypical antipsychotics and they gave few extra pyramidal effects and late dyskinesias. Paliperidone palmitate was the first SGA-LAIs to be developed for monthly injections [29–31].

However, the rate of use of LAIs varied from country to other one, and was generally higher in places where the outpatient system was more developed [31, 32]. In our study, the absence of a profile of prescribing SGA-LAIs was 23.6% compared to 16.6% for neuroleptics LAIs. While the availability of this last drug in different practice settings was quite considerable compared to SGA-LAIs, only 6.9% of the sample did not have access to neuroleptics LAIs while 51.4% did not have access to SGA-LAIs (Fig. 1).

The benefit attributed to neuroleptics LAIs was mainly relapse prevention; it was possible that the benefits of SGA-LAIs were broader. The side effects of neuroleptics caused patients to discontinue treatment. It was noted in a meta-analysis conducted after almost a decade of use of atypical antipsychotics that they decreased relapse rates, presumably because compliance was better with atypical antipsychotics than with neuroleptics [20]. They can be introduced early, either in the first episode or at the first relapse [33]. Neuroleptics LAI should therefore only be used in the maintenance phase if the oral form had previously been effective and the benefit/risk balance was favorable [34]. As a result, the major argument for the choice of a delayed form had been overlooked when atypical antipsychotics were developed [20, 33, 34].

Concerning compliance, prospective studies showed that an extended-release form of a second-generation antipsychotic could be beneficial compared to oral forms [35]. Other reports have concluded that SGA-LAIs

improve compliance and thus reduce hospitalization or relapse rates, making them the primary reason for prescribing [36–39]. The recent, guidelines for treating patients with schizophrenia, published by American Psychiatric Association, advocate that patients receive treatment with an antipsychotic LAI if they prefer such treatment or if they have a history of poor or uncertain adherence [5]. Prescribing an antipsychotic LAI could allow the clinician to focus on other reasons for the worsening of the disease, other than nonadherence, such as substance use or psychosocial stressors [32]

From an economic viewpoint, S. Druais and his team carried out a study in 2015 to compare the overall costs of the different therapeutic strategies used in France for treating schizophrenia by combining aspects of the patient's quality of life and the number of relapses avoided [40]. Over a 5-year period, the cost of treatment with SGA-LAIs was not higher than that with neuroleptics. In addition to that, they reduced the number of relapses avoided by one-fifth (on average an additional 1000 euros per year) [40]. The fear reported by our practitioners about adverse effects concerned neuroleptics LAIs (19.4%) much more than SGA-LAIs (2.8%) with their higher cost considerably hindered their prescription for patients with schizophrenia (77.8%) (see Fig. 1). All these results should be interpreted with caution due to the simple size of mental health professionals involved in our survey. However, the use of injectable antipsychotics remained a real source of comfort and appeasement for many patients, and it was necessary to be able to accompany them to the end so that the benefit lasted over time.

In addition to the properties of the molecule and the clinical symptoms, the experience of the clinician and orientations of the care system interacted with the choice of the molecule and condition the therapeutic attitude [15, 32, 40]. Another frequent trend was that of off-label prescribing [41, 42]. Also, far from the clinical and pharmacological framework, was that of medico-legal responsibility, which put clinical safety before therapeutic effectiveness. Finally, the availability of treatments and the different galenic forms of a molecule could also explain the variability of prescribing for schizophrenia. In our study, the choice of molecule depended more on its efficacy (69.40%) and considering the degree of side effects linked to the product (45.80%) as well as the accessibility to its purchase (43.10%).

Good compliance was the goal of all mental health practitioners in front of patients with schizophrenia. However, only one-third of patients with schizophrenia were fully adherent to medication, one-third partially adherent, and the remaining third non-adherent [43]. These results were not so far from ours, where the quality of adherence was estimated at 40.3%.

Other factors may influence the choice of one molecule over another. Younger psychiatrists refer more to their initial training, whereas older psychiatrists more often refer to their personal professional experience. These two notions raise the question of time and reflect the influence of the psychiatrist's old on prescriptions [13]. The particularity of the type of practice may also impact the therapeutic attitudes. Salman's team noted differences in prescribing between public and private practitioners [44]. In our sample, public sector doctors represent (86.1%), while (13.9%) are from the private sector. The profile of the patients and severity of the symptoms encountered in the hospital versus the private sector may also have an impact on prescribing. Psychiatrists in both the public and private sectors declared that the patients profile influenced prescribing in 16.70% and symptoms profile in 26.40% case in our study.

Finally, many suggested hypothesis could explain the prescribing habits of our participants. As many countries of the Middle East and North Africa (MENA), the Moroccan health system has made significant progress over the last few decades [45, 46], with the primary objective of focusing care on the patient and improving the quality of services provided to the population [46]. Nevertheless, some challenges had to be taken up, especially in the mental health area, represented essentially by a significant shortage of human resources, in particular of psychiatrists, where the number of psychiatrists remains below 500 [11, 12] per 40,000,000 inhabitants [47, 48], and of material resources. Indeed, the country has only 10 psychiatric hospitals with a capacity of 1512 beds in the public sector [49, 50]. These epidemiological data may influence prescribing habits and push psychiatrists to choose therapeutic combinations between SGA and conventional neuroleptics to reduce the intensity and duration of symptoms and avoid relapses and hospitalizations. Moreover, the SGA high cost [51] and the low individual monthly income of Moroccan citizens (not exceeding 1793 Moroccan DH per month according to the High Commissariat for Planning in the Kingdom of Morocco (HCP)) [52], as well as the lack of availability of new antipsychotics marketed in developed countries combined with an insufficient budget allocated to these treatments, are among the factors limiting the choice of SGAs, in particular LAIs, as a therapeutic alternative that has proven its effectiveness in combating non-compliance with treatment and promoting the improvement of cognitive functions. Until now, palmitate of paliperidone is the only SGA-LAIs available in Morocco.

A new systematic review selecting 24 randomized trials concluded that trends in current guidelines for treating first- and multi-episode schizophrenia

patients emphasized that there was simply no 'one-size-fits-all' method to manage schizophrenia patients [53]. The guidelines indicated mostly consistent recommendations regarding the optimal dose range of antipsychotics, while guidance with regard to the choice and duration of treatment remains somewhat controversial. Clinicians may be influenced by guidelines of antipsychotics dose recommendations and their decision may also be affected by factors such as personal views, experience, risk perception, cultural background, and more.

## Conclusions

Our survey was first one in our country to look at prescribing habits toward patients with schizophrenia. The psychiatrist prescribing habits depended on various factors that may be related to the clinician, the patient, and to the drug. The aim is to optimize the clinical impact and adjust the treatment to care for goals and an individual patient's needs. The size of our sample did not reflect all Moroccan psychiatrists, but it was fairly representative. However, it would be interesting to expand the sample to better illustrate prescribing habits and analyse the factors influencing them in order to explain the disparity in guidelines and the divergence between theory and practice.

## Abbreviations

LAI	Long-acting Injectable
MA	Marketing authorisation for medical product
MENA	Middle East and North Africa
PANSS	Positive and Negative Syndrome Scale
SGA	Second-generation antipsychotic

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## Authors' contributions

W.M and J.S collaborated in the diffusion of the questionnaire. R.B and M.K agreed on the aim of the study and questionnaire and contributed to the writing of the manuscript. All authors have read and approved the final version of the manuscript.

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## Availability of data and materials

All data generated or analysed during this study are included in this published article [and its supplementary information files].

## Declarations

### Ethics approval and consent to participate

All participants are consent to participate to the study.

### Consent for publication

Not applicable.

**Competing interests**

The authors declare that they have no competing interests.

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**References**

- World Mental Health Report. <https://www.who.int/teams/mental-health-and-substance-use/world-mental-health-report>. Accessed 10 Feb 2023.
- WHO. Schizophrenia. <https://www.who.int/news-room/fact-sheets/detail/schizophrenia>. Accessed 16 Feb 2023.
- Rössler W, Salize HJ, van Os J, Riecher-Rössler A (2005) Size of burden of schizophrenia and psychotic disorders. *Eur Neuropsychopharmacol* 15(4):399–409
- Sankoh O, Sevalie S, Weston M (2018) Mental health in Africa. *Lancet Glob Health* 6(9):e954–e955
- Keepers GA, Fochtmann LJ, Anzia JM, Benjamin S, Lyness JM, Mojtabai R et al (2020) The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. *Focus (Am Psychiatr Publ)* 18(4):493–497
- Pietrini F, Albert U, Ballerini A, Calò P, Maina G, Pinna F et al (2019) The modern perspective for long-acting injectables antipsychotics in the patient-centered care of schizophrenia. *Neuropsychiatr Dis Treat* 15:1045–1060
- Duverger P, Malka J, Ninus A (2004) Prescription et observance. *Enfances Psy* 25(1):31–41
- Haddad PM, Brain C, Scott J (2014) Nonadherence with antipsychotic medication in schizophrenia: challenges and management strategies. *Patient Relat Outcome Meas* 5:43–62
- Morken G, Widen JH, Grawe RW (2008) Non-adherence to antipsychotic medication, relapse and rehospitalisation in recent-onset schizophrenia. *BMC Psychiatry* 8:32
- Guide affection de longue durée: schizophrénies - guide\_ald23\_schizophr\_juin\_07.pdf. [https://www.has-sante.fr/upload/docs/application/pdf/guide\\_ald23\\_schizophr\\_juin\\_07.pdf](https://www.has-sante.fr/upload/docs/application/pdf/guide_ald23_schizophr_juin_07.pdf). Accessed 26 May 2022.
- Ministère de Santé. Offre de soins de Santé au Royaume du Maroc. [http://cartesanitaire.sante.gov.ma/dashboard/pages2/rh\\_med\\_2021.html](http://cartesanitaire.sante.gov.ma/dashboard/pages2/rh_med_2021.html). Accessed 3 Feb 2023.
- Ministère de Santé. Offre de soins de Santé au Royaume du Maroc. [http://cartesanitaire.sante.gov.ma/dashboard/pages2/privé\\_medecin\\_2021.html](http://cartesanitaire.sante.gov.ma/dashboard/pages2/privé_medecin_2021.html). Accessed 3 Feb 2023.
- Hamann J, Langer B, Leucht S, Busch R, Kissling W (2004) Medical decision making in antipsychotic drug choice for schizophrenia. *AJP* 161(7):1301–1304
- Voirol P, Robert P-A, Meister P, Oros L, Baumann P (1999) Psychotropic drug prescription in a psychiatric university hospital. *Pharmacopsychiatry* 32(01):29–37
- Lapeyre-Mestre M, Desboeuf K, Aptel I, Chale JJ, Montastruc JL (1998) A comparative survey of antidepressant drug prescribing habits of general practitioners and psychiatrists. *Clin Drug Investig* 16(1):53–61
- Davids E, Bunk C, Specka M, Gastpar M (2006) Psychotropic drug prescription in a psychiatric university hospital in Germany. *Prog Neuropsychopharmacol Biol Psychiatry* 30(6):1109–1116
- Berrouiguet S, Barrigón ML, Brandt SA, Nitzburg GC, Ovejero S, Alvarez-García R et al (2017) Ecological assessment of clinicians' antipsychotic prescription habits in psychiatric inpatients: a novel web- and mobile phone-based prototype for a dynamic clinical decision support system. *J Med Internet Res* 19(1):e5954
- Efficacy and tolerability of olanzapine, quetiapine, and risperidone in the treatment of early psychosis: a randomized, double-blind 52-week comparison. <https://doi.org/10.1176/ajp.2007.164.7.1050>.
- Volavka J, Czobor P, Derks EM, Bitter I, Libiger J, Kahn RS et al (2011) Efficacy of antipsychotic drugs against hostility in the European First-Episode Schizophrenia Trial (EUFEST). *J Clin Psychiatry* 72(7):955–961
- Leucht S, Barnes TRE, Kissling W, Engel RR, Correll C, Kane JM (2003) Relapse prevention in schizophrenia with new-generation antipsychotics: a systematic review and exploratory meta-analysis of randomized, controlled trials. *Am J Psychiatry* 160(7):1209–1222
- He H, Zhou Y, Yang M, Li X, Xiang Y, Luo J (2018) Comparison of olanzapine versus other second-generation antipsychotics in the improvement of insight and medication discontinuation rate in schizophrenia. *Shanghai Arch Psychiatry* 30(3):178–187. <https://doi.org/10.11919/j.issn.1002-0829.217087>
- Kahn RS, Fleischhacker WW, Boter H, Davidson M, Vergouwe Y, Keet IPM et al (2008) Effectiveness of antipsychotic drugs in first-episode schizophrenia and schizophreniform disorder: an open randomised clinical trial. *Lancet* 371(9618):1085–1097
- Ouanes S, Becetti I, Ghuloum S, Hammoudeh S, Shehata M, Ghabrash H et al (2020) Patterns of prescription of antipsychotics in Qatar. *PLoS ONE* 15(11):e0241986
- Barber S, Olotu U, Corsi M, Cipriani A (2017) Clozapine combined with different antipsychotic drugs for treatment-resistant schizophrenia. *Cochrane Database Syst Rev* 3(3):CD006324. <https://doi.org/10.1002/14651858.CD006324.pub3>
- Taylor DM, Smith L (2009) Augmentation of clozapine with a second antipsychotic – a meta-analysis of randomized, placebo-controlled studies. *Acta Psychiatr Scand* 119(6):419–425
- Correll CU, Rummel-Kluge C, Corves C, Kane JM, Leucht S (2009) Antipsychotic combinations vs monotherapy in schizophrenia: a meta-analysis of randomized controlled trials. *Schizophr Bull* 35(2):443–457
- Landmark J, Merskey H, Cernovsky ZZ (1994) Fluphenazine treatment of DSM-III-R male schizophrenic patients among the xhosa. *Can J Psychiatry* 39(4):219–222
- Ortiz-Orendain J, Obeso SC, Colunga-Lozano LE, Hu Y, Maayan N, Adams CE (2017) Antipsychotic combinations for schizophrenia. *Cochrane Database Syst Rev* 6(6):CD009005. <https://doi.org/10.1002/14651858.CD009005.pub2>
- Crocq M-A (2015) Histoire des traitements antipsychotiques à action prolongée dans la schizophrénie. *L'Encéphale* 41(1):84–92
- Kennedy WK, Ellingrod VL (2012) When and how to use long-acting injectable antipsychotics. *Curr Psychiatry* 11(8):40–43
- Long-acting injectable antipsychotics: a practical guide for prescribers - Psychopharmacology Institute. <https://psychopharmacologyinstitute.com/publication/long-acting-injectable-antipsychotics-a-practical-guide-for-prescribers-2201>. Accessed 4 Feb 2023.
- Citrome L (2021) Long-acting injectable antipsychotics: what, when, and how. *CNS Spectr* 26(2):118–129
- Canceil O, Limosin F, Passerieux C (2009) Quels sont les facteurs limitant le recours à un APAP et comment les dépasser ? *L'Encéphale* 35:S101–S107
- Samalin L, Abbar M, Courtet P, Guillaume S, Lancrenon S, Llorca P-M (2013) Recommandations Formalisées d'Experts de l'AFPBN : prescription des neuroleptiques et antipsychotiques d'action prolongée. *L'Encéphale* 39:189–203
- Aarab C, Elghazouani F, Aalouane R, Rammouz I (2015) Facteurs de risque de l'inobservance thérapeutique chez les patients schizophréniques: étude cas-témoins. *Pan Afr Med J* 20:273
- Llorca PM, Miadi-Fargier H, Lançon C, JassoMosqueda G, Casadebaig F, Philippe A et al (2005) Analyse coût-efficacité des stratégies de prise en charge des patients schizophréniques : place d'un antipsychotique atypique sous forme injectable à libération prolongée. *L'Encéphale* 31(2):235–246
- Viala A, Cornic F, Vacheron M-N (2012) Treatment adherence with early prescription of long-acting injectable antipsychotics in recent-onset schizophrenia. *Schizophr Res Treatment* 2012:368687
- Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO et al (2005) Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *N Engl J Med* 353(12):1209–1223
- McCabe R, Bullenkamp J, Hansson L, Lauber C, Martínez-Leal R, Rössler W et al (2012) The therapeutic relationship and adherence to antipsychotic medication in schizophrenia. *PLoS ONE* 7(4):e36080
- Druais S, Doutriaux A, Cognet M, Godet A, Lançon C, Levy P et al (2017) Comparaison des bénéfices médico-économiques des antipsychotiques dans la prise en charge de la schizophrénie en France. *L'Encéphale* 43(4):311–320
- Haw C, Stubbs J (2007) Benzodiazepines—a necessary evil? A survey of prescribing at a specialist UK psychiatric hospital. *J Psychopharmacol* 21(6):645–649
- Benoit M, Bellivier F, Llorca P-M, Millet B, Passamar M, Schwan R et al (2012) Treatment initiation in psychotic and manic episodes: French attitudes collected by Focus Group. *Encephale* 38(3):266–273

43. Masand PS, Roca M, Turner MS, Kane JM (2009) Partial adherence to antipsychotic medication impacts the course of illness in patients with schizophrenia: a review. *Prim Care Companion J Clin Psychiatry* 11(4):147–154
44. Samalin L, Guillaume S, Auclair C, Llorca P-M (2011) Adherence to guidelines by French psychiatrists in their real world of clinical practice. *J Nerv Ment Dis* 199(4):239–243
45. Overview Middle East and North Africa. World Bank. <https://www.worldbank.org/en/region/mena/overview>. Accessed 16 Feb 2023.
46. Rapport du ministère de la santé du royaume du Maroc \_Stratégie Nationale de Financement de la Santé VD avril 2021.pdf. [https://www.sante.gov.ma/Documents/2021/rapport\\_SNFS%20VD%20avril%202021.pdf](https://www.sante.gov.ma/Documents/2021/rapport_SNFS%20VD%20avril%202021.pdf). Accessed 16 Feb 2023.
47. Haut-Commissariat au Plan. Recensement Général de la Population et de l'Habitat 2014 Royaume du Maroc. <http://rgphentableaux.hcp.ma/>. Accessed 16 Feb 2023.
48. Gauthier C. Recensement population (RGPH) 2014. Site institutionnel du Haut-Commissariat au Plan du Royaume du Maroc. [https://www.hcp.ma/Recensement-population-RGPH-2014\\_a2941.html](https://www.hcp.ma/Recensement-population-RGPH-2014_a2941.html). Accessed 16 Feb 2023.
49. Ministère de Santé. Offre de soins de Santé au Royaume du Maroc. [http://cartesanitaire.sante.gov.ma/dashboard/pages2/index\\_2021.html](http://cartesanitaire.sante.gov.ma/dashboard/pages2/index_2021.html). Accessed 14 Feb 2023.
50. Fiche technique sur l'offre de soins de santé au Maroc - année 2021. [http://cartesanitaire.sante.gov.ma/ftnrd?p\\_idniveau=5](http://cartesanitaire.sante.gov.ma/ftnrd?p_idniveau=5). Accessed 14 Feb 2023.
51. Zouitni K, Moundib A, Elqarfaoui K (2017) L'usage des médicaments psychiatriques au Maroc : entre vécu familial et discours professionnel. *Inf Psychiatr* 93(6):479–485
52. Gauthier C. Revenus des ménages Niveaux, sources et distribution sociale. Site institutionnel du Haut-Commissariat au Plan du Royaume du Maroc. [https://www.hcp.ma/Revenus-des-menages-Niveaux-sources-et-distribution-sociale\\_a2697.html](https://www.hcp.ma/Revenus-des-menages-Niveaux-sources-et-distribution-sociale_a2697.html). Accessed 15 Feb 2023.
53. Hui CLM, Lam BST, Lee EHM, Chan SKW, Chang WC, Suen YN et al (2019) A systematic review of clinical guidelines on choice, dose, and duration of antipsychotics treatment in first- and multi-episode schizophrenia. *Int Rev Psychiatry* 31(5–6):441–459

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