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The Use of Electroconvulsive Therapy in France: Initial National Findings Underline Significant Disparities

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Electroconvulsive therapy (ECT) consists of triggering an epileptic crisis under general anaesthesia. It is one of the recommended treatments for severe psychiatric disorders that are resistant to standard treatments, particularly pharmacological ones. This procedure is associated with negative representations in the public mind, its mechanisms of action remain little understood and the literature on the wide-scale use of ECT is scarce.

In this context, this study examined the use of ECT in mainland France in 2019 and identified the main factors associated with its variation, using hospital activity data from the French Agency for Information on Hospital Care (ATIH), which, since 2017, includes an exhaustive record of ECT procedures. According to this data, ECT was used to treat 3,705 persons (44,668 procedures) in France in 2019; it is therefore a highly specialised treatment that is rarely prescribed. Just over 1% of adults hospitalised for at least one whole day in psychiatric facilities were treated with ECT, and they were older, most often female, and had more severe and complex psychiatric disorders than the other persons hospitalised under the same conditions. These clinical characteristics comply with national guidelines.

Nevertheless, significant variations in the rate of use of ECT have been observed between hospitals in charge of referrals to this procedure. Furthermore, these variations did not seem to be solely associated with patients' characteristics but also –and much more significantly– with health care supply characteristics: in particular, the type of facility in charge of the psychiatric follow-up and the distance to the closest facility providing ECT. This finding raises questions about the heterogeneity of treatments for psychiatric disorders and the access to specialised psychiatric care.

Electroconvulsive therapy (ECT) is a treatment mainly used in psychiatry that consists of triggering an epileptic crisis under general anaesthesia by briefly passing an electric current through the patient's brain (see Inset 1). Its effectiveness has been demonstrated in

treating mood disorders (unipolar or bipolar depression, manic or mixed episodes) and catatonic syndrome (UK ECT Review Group, 2003). ECT is also indicated for the treatment of certain forms of schizophrenia, with more contrasting effects, as well as – more rarely– for degenerative diseases

with behavioural disorders (ANAES, 1998). Nevertheless, while many sci-

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entific studies concur on the benefits and innocuity of ECT for persons suffering from severe and drug-resistant psychiatric disorders, in comparison with the long-term administration of psychotropic medicines, there is an ongoing debate on these issues in the scientific literature (Gergel et al., 2021; Read et al., 2019). ECT is prescribed, after the mandatory consent of patients to the treatment, in two types of situations: drug-resistance and life-threatening crises. Hence, referral to an ECT treatment is based on a thorough examination of patients, which verifies the ineffectiveness of the other available therapies or the impossibility of using them.

Since the end of the 1990s, the use of ECT has been regulated in France by clinical guidelines that still apply today (ANAES, 1998) and which were reaffirmed more recently as part of recommendations for the care of specific psychiatric disorders (ANSM, 2006; HAS,

2017). Nevertheless, despite a globally demonstrated effectiveness for individuals suffering from severe disorders that resist other forms of treatment, and estimated side effects that are very often temporary and rare (see Inset 1), ECT is still associated with negative representations (Dowman et al., 2005). However, the public's perception has changed over time (see Inset 2).

Significant variations in the use of ECT have been described in several countries (Leiknes et al., 2012; Sanz-Fuentenebro et al., 2017). Their extent suggests that they do not result solely from differences in patients' health needs. According to the international literature, variations in medical practices may, in particular, be linked to differences in the preferences or habits of care providers, in particular in a context of uncertainty (for example, a proven effectiveness but negative representations of ECT) or trade-offs between opportunities and constraints

CONTEXT

This research, which was conducted as part of a master 2 internship in public health, falls within the scope of studies documenting medical practice variations in psychiatry in the French context (Coldefy et al., 2012; Gandré et al., 2018). It is also part of a long series of studies on those variations, conducted by the Institute for Research and Information in Health Economics (Irdes), in other medical specialties (for example, Mousquès et al., 2008).

See also: An international scientific publication (Lecarpentier et al., 2022a) and an Irdes research report (Lecarpentier et al., 2022b).

linked to their working environment (for example, the availability of equipment such as technical platforms for ECT) [Mercuri and Gafni, 2011]. Nevertheless, most of the existing research focuses on variations between geographical areas—which tend to hide the differences between care providers located in the same region—or on variations between the facilities practising ECT, and not on those in charge of the referral to this treatment. Hence, a better understanding of the variations in the use of ECT requires a focus on the 'decision-making' rather than on the 'operational' level.

It is also important to take into account the singularity of national situations, clinical guidelines, and the legislation in relation to ECT, which varie according to countries (Leiknes et al., 2012). This study was conducted in a context in which the lack of data on the use of ECT is regularly highlighted in the public debate. For example, the newspaper *Le Monde* was concerned in 2012 about 'the impossibility of knowing how many patients are treated with electroconvulsive therapy in mainland France' (Cabut, 2012). This observation is also shared by the scientific community. Hence, in previous studies, researchers have underlined the need for an assessment of the use of ECT around the world to ascertain its compliance with clinical guidelines, and have underscored the incompleteness or inexistence of national data, which do not allow providing enough information to the various stakehold-

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Electroconvulsive therapy in practice

In each session, ECT is administered jointly by a psychiatrist and an anaesthetist in an operating theatre or a recovery room. This therefore requires a suitable technical platform, which cannot always be set within the hospital in charge of the main psychiatric follow-up, which then organises the transfer of patients to a facility that has the necessary technical resources. General anaesthesia (without intubation) for ECT lasts several minutes and involves paralytic drugs to prevent movement. Monitoring in the recovery room for at least 30 minutes is then required before the patient leaves the ECT treatment area. ECT used as an initial curative treatment typically involves 12 to 20 sessions (two to three per week). More ad hoc treatment can also be provided in emergency situations and is stopped as soon as the condition (malnutrition linked to catatonia, suicidal risk, etc.) ceases to be life threatening (a single session is sometimes enough). ECT can also be used as a maintenance treatment to prevent relapse and is then administered in a monthly session, which can take place on an outpatient basis.

The most frequent side effects of ECT are cognitive disorders, and in particular memory loss, which is mainly transient—ven if there are reported cases of persistent losses—and the usual adverse events related to general anaesthesia.

More rarely, there may be mechanical lesions on the patient's teeth, shoulders, and vertebrae when the paralytic drugs fail to prevent the patient from moving, as well as a rare—but significant risk—of adverse cardiac incidents. Lastly, the risk of mortality associated with this treatment is similar to that of minor surgeries, but remains less than that induced by the long-term administration of tricyclic anti-depressants (Kaster et al., 2021; UK ECT Review Group, 2003). However, some authors are calling for ongoing large-scale controlled randomised studies to validate the benefit-risk ratio of ECT (Read et al., 2019). Furthermore, the potential side effects of ECT must be explained in advance and in a transparent manner to the individuals with an indication for this treatment—in whom the prospect of the ECT procedure can generate anxiety (ANAES, 1998).

The World Health Organisation (WHO) stipulates that ECT must not be used without obtaining the free and informed consent of the persons concerned, nor in individuals under the age of eighteen, and never in its unmodified form (for example, without an anaesthetic and a muscle relaxant). Clinical guidelines based on the best available evidence, specifying when and how ECT can or cannot be used, must be available and complied with (WHO, 2012).

ers involved (clinicians, individuals treated, their families, and the general public with many preconceptions about this treatment...) [Haesebaert et al., 2020]. The absence of recent, detailed, and contextualised data made public about the use of ECT participates in maintaining fears about this practice, which remains little known. The availability of an additional record of ECT procedures in France in 2017 (see Inset Sources), which was the departure point for this study, provided large-scale information based on data that was more exhaustive and less biased than survey data commonly leveraged outside France to assess the use of this treatment (Haesebaert et al., 2020; Sanz-Fuentenebro et al., 2017).

In this context, this study aims at documenting the use of ECT for patients hospitalised in a psychiatric unit and its variations, specifically among

healthcare providers in charge of the referral for this treatment, as well as at identifying the factors significantly associated with these variations at the national level.

A highly specialised treatment that is used for a limited number of individuals

Before applying inclusion and exclusion criteria, 3,705 individuals were reported as having undergone ECT treatment in 2019 (of whom less than 5% were not treated in an identifiable hospital psychiatric unit that year); that is a total of 44,668 procedures and a rate of use of 0.6 per 10,000 inhabitants per year. This places France in an intermediate position amongst the countries for which this rate is available, and where it ranges from 0.04 (in Latvia) to 5.1 (in the United States) per 10,000 inhabitants per year (Leiknes et al., 2012) (aside from Slovenia, where the use of ECT is prohibited) (Gazdag et al., 2017). Nevertheless, international comparisons should be

made with caution, due to the variability in the study years and data collection methods.

A treatment that is used to a greater extent for certain specific populations, suggesting a relative compliance with clinical guidelines

Of the 419,794 patients treated on a full- or part-time basis in a hospital psychiatric unit in France in 2019, 298,966 were aged over 18 and hospitalised full-time for at least one day in the year in a psychiatric unit for adults located in mainland France, therefore meeting the inclusion and exclusion criteria (see Inset Method). Among these patients, 3,288 (1.1%) underwent ECT treatment that year. They were more often female and older than the other individuals hospitalised full time for at least one day in the year, in line with the results reported in the international literature (Leiknes et al., 2012). Likewise, they were more likely to live in less deprived areas and were less often included in the Complementary

SOURCES

This research was primarily based on a record of electroconvulsive therapy (ECT) procedures, available both in the Programme for the Medicalisation of Information Systems in the fields of Medicine, Surgery, and Gynaecology/Obstetrics (PMSI-MCO) and, since 2017, in the Medical Information Database for Psychiatry (Rim-P). These two databases, managed by the French Agency for Information on Hospital Care (*Agence Technique de l'Information sur l'Hospitalisation*, ATIH), represent a nationwide system for the collection of standardized administrative and medical data on care provided in hospital settings, making it possible to monitor the use of hospital care in the field of MCO and that of psychiatry, respectively. In addition to the record of ECT procedures, the research used data from the Rim-P on full-time hospitalisations in a psychiatric unit and on the clinical, demographic, and socio-economic characteristics of patients. Lastly, other data sources (the National Register of Healthcare and Social Establishments (FINESS), the Annual Statistical Survey of Healthcare Facilities (SAE), the National Institute of Statistics and Economic Studies (*Institut national de la statistique et des études économiques*, INSEE) databases, and the Shared Directory of Health Professionals (RPPS)) were used in a more ad hoc manner to obtain data on the factors potentially associated with variations in the use of ECT.

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The use of electroconvulsive therapy over the centuries

In the 18th century, doctors empirically discovered the link between loss of consciousness and an improvement in the health status of individuals who suffered from psychiatric disorders. Various and numerous experiments were conducted in the first half of the 20th century, involving, in particular, malaria inoculation, causing malaria attacks that were supposed to be curative, the induction of a hypoglycaemic coma using insulin, and then convulsive therapy in the 1930s. The latter consisted of convulsive seizures caused initially by camphor, then by derivatives, and, lastly, by short bursts of alternating current, made available through the implementation of mains power in towns and probably prompted by the success of cardiac electroshock treatment. Electroconvulsive therapy (ECT) is the only one still in use today, but acceptance of the treatment has changed over time. After having spread rapidly throughout the Western world at the end of the 1930s, ECT, rivalled by the arrival of psychotropic drugs, was widely criticised, due in particular to abusive

practices during the Second World War. It was only in the decade 1970–80 that the treatment made a comeback, due, on the one hand, to the identification of the limitations of psychotropic drugs (relapse, side effects, drug resistance, etc.), and, on the other hand, the proven effectiveness of ECT in randomised clinical trials. Clinical guidelines were then published in many countries, including France (ANAES, 1998). The anaesthetic procedure, the modulation and intensity of the electrical current, the location of electrode placement on the head, and the number and frequency of the sessions were thus regulated by national guidelines. In addition, the pathophysiological explanations for the effectiveness of the treatment have also changed over time, but remain little understood. Recently, the prevailing hypothesis is that of an adaptive response to an epileptic seizure, generating an increase in brain plasticity and neurogenesis stimulation, which modifies neurotransmitter balance and affects mood and perception of reality.

Universal Health Insurance scheme, the scheme covering health care costs for low-income groups (*Couverture Maladie Universelle Complémentaire*, CMU-C). Lastly, they suffered more often from severe or complex depression and bipolar disorder, and were more likely to have severity markers than the other individuals hospitalised full time for at least one day in the year (see Table 1).

Our results allow initial comparisons between the use of ECT in psychiatric care facilities and national clinical guidelines relating to this treatment. The fact that it mainly concerned patients diagnosed with severe or complex depression, bipolar disorder,

and psychotic disorder seem to indicate a relative consistency with guidelines regarding the indication of this treatment (ANAES, 1998; ANSM, 2006; HAS, 2017). However, 7% of the individuals who received ECT treatment were diagnosed as suffering from mild depression or other disorders, including, in particular, anxiety and substance abuse disorders. While this result raises questions about the relevance of having referred certain patients for ECT, it may also be related to the particularities of establishing a psychiatric diagnosis and of reporting it in the databases used in this research (difficulty in accurately identifying the disorder, reluctance of some clinicians to make diagnoses seen as stigmatising

for their patients, etc). In addition, the fact that those who received ECT treatment were more likely to have severity markers suggest that they were indeed patients with severe psychiatric disorders who did not respond to standard treatments, and for whom ECT treatment was an adequate indication. Lastly, the fact that a significant proportion of the patient population receiving ECT were elderly individuals is also in line with clinical guidelines, which report that, based on clinical experience, ECT is often better tolerated by these individuals than certain pharmaceuticals (ANAES, 1998).

METHOD

Scope and study population

The research was conducted leveraging 2019 data, the most recent data year available before the Covid-19 pandemic, which has had a significant impact on the use of healthcare in France. The French Agency for Information on Hospital Care (ATIH) considers that the data from this year is the most complete since the development of the broader record of ECT procedures, due to the time required to get the database up and running and filled in by hospitals. This research focused on adult patients hospitalised full time for at least one whole day in a psychiatric unit in mainland France in 2019. Since hospitalisation is considered a marker of severity of disorders, we focused on a relatively homogeneous population of patients whose determinants of the use of ECT were likely to be similar. Hence, patients who were only hospitalised in a day-care facility were excluded –as the organisation of this form of hospitalisation differs greatly according to the facility–, as were patients who only received ambulatory care (more than 90% of the patients who received ECT treatment in 2019 were hospitalised for at least one day in the same year and were therefore included in this study). Also excluded were patients hospitalised in facilities that only had child psychiatry services, whose healthcare procedures differ from psychiatric services for adults, and all patients under the age of 18 –as there are differences with adult patients, in particular with regard to consent provision?–, and patients hospitalised in French overseas local counties (départements) and territories, where ECT is not always available.

Units of analysis

Hospitals that referred patients to ECT –and not hospitals that provided ECT treatment– were selected for the study of the variations in the use of ECT. Facilities that provide ECT treatment may indeed only play the role of ‘service providers’ due to the technical platform at their disposal and do not take part in the medical decision to refer a patient to ECT (according to our estimates, this applies to over a third of the patients). Consequently, the unit of analysis used to document the variations in the use of ECT was the hospital in charge of the main psychiatric follow-up (the most detailed unit of analysis available in the databases used). In order to identify this facility for each patient meeting the inclusion or exclusion criteria, we identified the hospital in which the patient was hospitalised for the greatest number of days between the beginning of 2018 and the first ECT procedure in 2019 (and so until the end of 2019 for the patients who had not received ECT treatment). This

selection was made after standardising the level of identification of the hospitals (Lecarpentier et al., 2022b).

Variable for ECT use

For all the patients included in this research, the binary variable of interest was the conduction of at least one ECT procedure in 2019, calculated for each patient. The rate of use of ECT was also calculated per hospital in charge of the main psychiatric follow-up by dividing the number of patients hospitalised for at least one whole day in 2019 and who had undergone at least one ECT procedure in that year by the total annual number of patients hospitalised full time in the hospital.

Conceptual framework and factors associated with the variations in the use of ECT

Three categories of factors potentially associated with the use of ECT were included, based on a conceptual framework drawn from the international literature on medical practice variations (Mercuri and Gafni, 2011): patient characteristics (the demand side), health care provider characteristics (the supply side) and characteristics of the environment (practice context). We therefore used variables characterising the patients hospitalised full time at the individual level and the hospitals in charge of the main psychiatric follow-up, as well as contextual variables characterising the local area in which these hospitals are located (Lecarpentier et al., 2022a, 2022b).

Analysis

We initially described the characteristics of the patients who had –or had not– received ECT treatment and the variability in the use of ECT between the hospitals in charge of the main psychiatric follow-up. Subsequently, a multivariable analysis of the factors potentially associated with the variations in the use of ECT was conducted to determine their effects, all other observable characteristics being equal. We used a random intercept multilevel logistic regression model, which made it possible to take into account the hierarchical structure of the data and modelize the probability of having received ECT treatment at an individual level. Patients’ characteristics were included in the first level, while the characteristics of the hospital in charge of the main psychiatric follow-up and of their environment were included in the second level after prior verification of the correlations between these variables (Lecarpentier et al., 2022b).

The rate of use of ECT varied significantly according to the facility in charge of the main psychiatric follow-up

The study population was seen in 468 hospitals in charge of its main psychiatric follow-up. The average rate of use of ECT in these facilities was 1.1 per 100 patients hospitalised full time. In 137 facilities (29%), not a single patient was referred for ECT treatment. The coefficient of variation (CV), which was much higher than 1 (see Table 2), reflects a significant variability in the use of ECT between facilities. This finding remains even when facilities that have not referred any patient to ECT in 2019 are not taken into account (CV=2.3). The extent of the observed variations raises questions in a context in which the historical territorial organisation of French psychiatry is meant to guarantee a certain homogeneity in available mental health care provision and access to more specialised services that are not available locally, wherever the individuals' place of residence.

Variations between facilities that are not solely related to differences in patients' needs, but also to health care supply characteristics

A large share of the total variation in the rates of use of ECT (69%) arises from differences within psychiatric care facilities. These intrahospital variations are probably due to unobserved differences in severity, resistance to treatment, and therapeutic failures experienced by patients treated and to potential variability between departments or health professionals within the same facility that cannot be observed using the available data. However, this variability is estimated to be lower than that observed between self-employed professionals, as a result of a culture of collegial decision-making in hospital settings. Incidentally, almost one third (31%) of the total variation in the rate of use of ECT is linked to differences between facilities (interhospital variations). We focus on these variations as they may be associated with factors on which it is possible to have an impact through dedicated public policies, especially as they are more strongly

T1

Characteristics of the study population, depending on whether they have or have not been treated with ECT

	Patients with ECT (n=3,288)	Patients without ECT (n=295,678)
	In %	In %
Demographic characteristics		
Female	63.84	49.91
Age		
18–30 yrs	6.78	19.34
31–40 yrs	9.88	17.72
41–50 yrs	15.63	21.02
51–60 yrs	21.38	19.85
61–70 yrs	23.18	12.19
71 yrs or over	23.14	9.87
Socio-economic characteristics		
Beneficiary of the CMU-C ¹	5.20	12.59
Neighborhood socio-economic deprivation index (FDep index)²		
1 st quintile	24.60	15.71
2 nd quintile	20.59	17.90
3 rd quintile	22.29	22.80
4 th quintile	19.65	23.81
5 th quintile	12.41	18.28
Missing value	0.46	1.50
Clinical characteristics		
Diagnostic group		
Mild depression	1.79	6.89
Severe depression	28.56	18.34
Depression with psychotic or catatonic characteristics	21.47	4.18
Bipolar depression	21.75	5.67
Bipolar disorder with manic, hypomanic or mixed episode	7.48	5.63
Psychotic disorder without mood disorder	13.66	22.74
Other diagnoses	5.29	36.55
Severity markers		
A history of therapeutic seclusion in 2018	8.21	4.84
A history of suicide attempt in 2018	6.33	4.69

¹ Still in place during the study period.

² The higher the quintile, the higher the deprivation.

Scope: Adult patients hospitalised full time for at least one whole day in a psychiatric unit in mainland France in 2019 (n=298,966).

Sources: Rim-P and PMSI-MCO; year: 2019 (or 2018 for indicators relating to severity markers).

[Download the data](#)

T2

Rate of ECT use across hospitals in charge of the psychiatric follow-up

	Mean (Standard deviation)	Median (Interquartile range)	Coefficient of variation
Rate of ECT use for 100 patients hospitalised full time for at least one whole day in a psychiatric unit	1.12 (3.11)	0.39 (0.95)	2.78

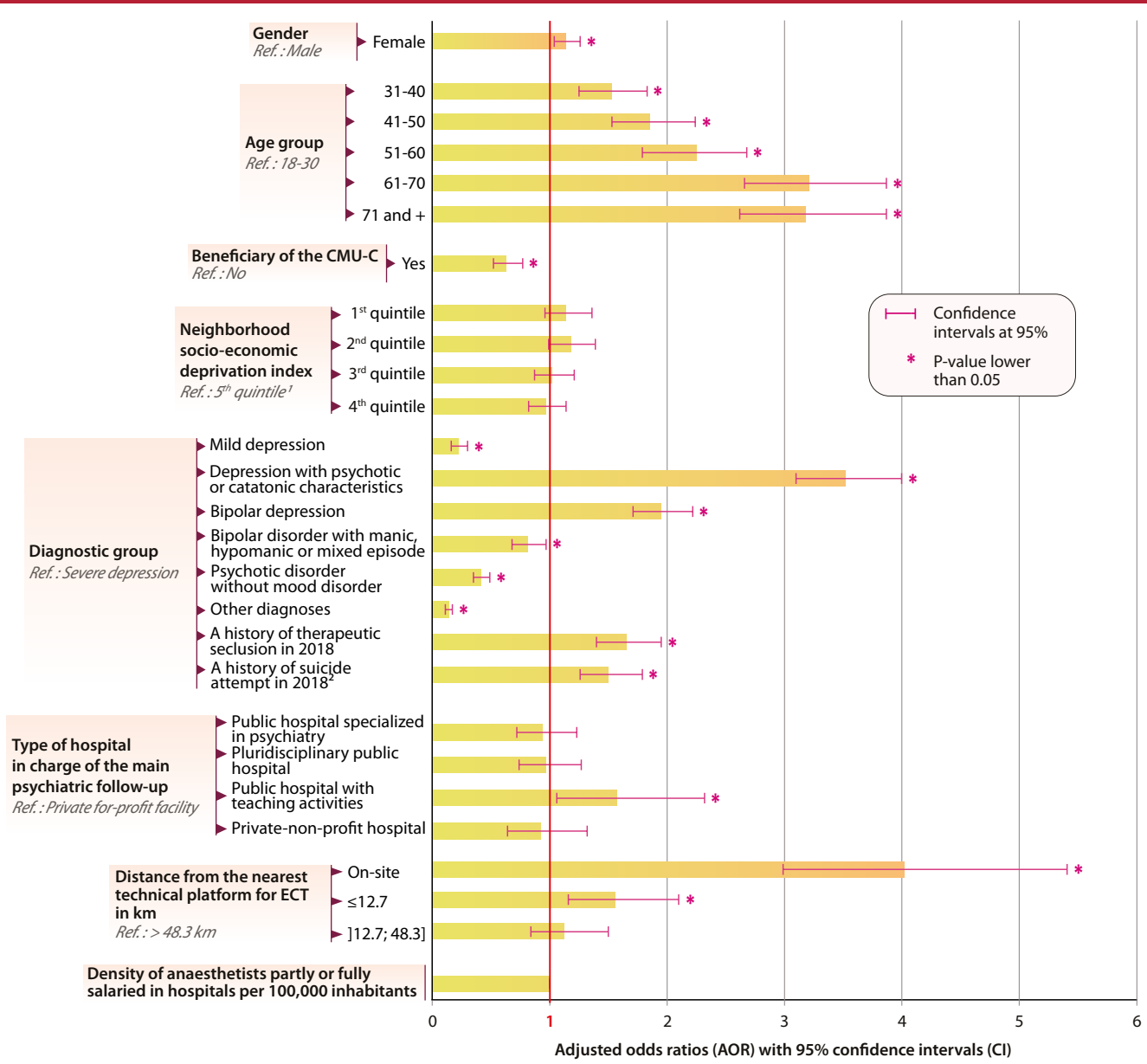
Scope: Adult patients hospitalised full time for at least one whole day in a psychiatric unit in mainland France in 2019 (n=298,966), mostly followed-up in 468 hospitals.

Sources: Rim-P and PMSI-MCO; year: 2019.

[Download the data](#)

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Factors associated with variations in the use of electroconvulsive therapy (ECT)



¹ The higher the quintile, the higher the deprivation; ² hospital stays for ICD-10 X60-X84 (associated diagnosis), regardless of the main diagnosis, based on the methodology defined by the French Agency for Information on Hospital Care (ATIH) and Santé Publique France.

See the definition of AOR and CI95% in Inset 3.

Scope: Adult patients hospitalised full time for at least one whole day in a psychiatric unit in mainland France in 2019 (n=298,966), mostly followed-up in 468 hospitals.

Source: Rim-P and PMSI-MCO; year: 2019 (or 2018 for indicators relating to severity markers: therapeutic seclusion and attempted suicide).

[Download the data](#)

I3

Definition of the adjusted odds ratio

The adjusted odds ratio (AOR) reflects the significance of the association between the fact that an individual received at least one ECT treatment in 2019 and each characteristic of patients, hospitals in charge of the main psychiatric follow-up, and their environment, after adjusting on the other factors likely to be associated with this treatment. An AOR equal to 1 (or whose confidence interval at

95%, CI95%, includes 1) reflects the lack of significant association between the characteristic studied and the use of ECT; an AOR higher than 1 (and whose CI95% does not include 1) indicates a significant association between the characteristic studied and a greater use of ECT; and an AOR lower than 1 (and whose CI95% does not include 1) indicates a significant association between the

characteristic studied and a lower use of ECT. The more the AOR is far from 1, the higher the strength of the association. In case of a rare event, such as patients hospitalised full time in a psychiatric unit receiving ECT treatment (prevalence of around 1%), the AOR can be interpreted as a relative risk.

associated with the characteristics of the hospital in charge of the main psychiatric follow-up and its location (which accounts for more than 44% of these variations) than individual socio-demographic or clinical characteristics of patients (which accounts for less than 7% of these variations).

With regard to the characteristics of the patients, all observable characteristics being equal, ECT seems to be significantly more frequently used to treat women (who often have more severe depressions than men, and whose severity cannot be entirely captured by the available data), the oldest individuals, and those suffering from severe or complex depression (see Graph), confirming a relative consistency with clinical guidelines. However, after adjusting for the other characteristics, this use is significantly less frequent amongst individuals included in the scheme covering health care costs for low-income groups (CMU-C) [see Graph], suggesting disparities in the use of ECT according to the socio-economic status of patients. The CMU-C is, however, only a partial indicator of precarity, primarily due to the fact that individuals entitled to benefit from it do not always apply to receive it (difficulties in navigating the benefits system) and that the income threshold required to benefit from the CMU-C is lower than the level of certain minimum social benefits, such as benefits for disabled persons (*Allocation aux Adultes Handicapés*, AAH), minimum old age pension, etc.

With regard to the characteristics of the hospital in charge of the main psychiatric follow-up and its location, all observable characteristics being equal, the use of ECT is significantly more frequent amongst patients treated in public hospitals with teaching activities compared with the other types of hospitals (see Graph). Although this more frequent use of ECT was also observed amongst patients treated in private for-profit hospitals in a preliminary univariate analysis, it was most likely linked to the specificities of their patient case-mix, because this result was no longer significant in the multivariable analysis, which adjust on this case-mix. Several hypotheses may explain the more frequent use of ECT for individuals treated in hospitals with teaching activities: in particular, greater access

to anaesthetists, the highly specialised nature of this practice which requires referral to reference facilities, the presence within them of expert centres for certain severe drug-resistant psychiatric disorders, and better diffusion of clinical guidelines within hospitals with teaching activities. Furthermore, the multivariable analysis shows that a patient whose hospital in charge of the main psychiatric follow-up has an on-site technical platform for ECT is more than four times more likely to receive this treatment than a patient whose hospital in charge of the main psychiatric follow-up is more than 48 kilometres away from such a platform (see Graph). This may be linked to the fact that the geographical proximity of a technical platform for ECT would make the clinicians more familiar with this practice and more likely to refer their patients to this treatment, which requires several consecutive sessions and therefore has to be easily accessible. But this may also be linked to inequalities in access to ECT for patients whose health status constitutes an indication for this treatment but who are being followed-up at a facility that is too far away from the necessary technical resources or for which no coordination has been set up with facilities that can carry out ECT. Hence, the implementation of clearly defined referral pathways between hospitals in charge of psychiatric follow-up and technical platforms for ECT at the national level may reduce the loss of opportunity for certain patients suffering from severe psychiatric disorders that do not respond to standard treatments. Lastly, while the limited availability of anaesthetists is often highlighted by psychiatrists as a barrier to the use of ECT, the density of these healthcare professionals (fully salaried in hospitals or both salaried in a hospital and self-employed) at the local county ('département') level is not part of the variables that appear to be significantly associated with the use of ECT in our study (see Graph). However, this result may be linked to the availability of this variable solely at the local county level—a level that may not be detailed enough to enable highlighting a significant association.

* * *

The availability of an additional record of ECT procedures in France since

2017 provided large-scale information on this practice, based on data that was more exhaustive and less biased than survey data commonly used outside France, even though variations in the exhaustiveness of the record between facilities cannot be completely excluded. Our results show that ECT is used to treat a limited number of individuals, which suggests a relative compliance with clinical guidelines for patients hospitalised full-time for at least one whole day in the year in a psychiatric unit. Nevertheless, these results also highlight disparities in the use of this procedure which are associated with healthcare supply characteristics, raising questions about the heterogeneity of the treatment of severe drug-resistant psychiatric disorders, whereas French psychiatry was initially conceived in such a way as to provide similar psychiatric services throughout the country via a territorial organisation. The lack of a stepped-care approach in mental health as well as the compartmentalisation of psychiatric and somatic care, resulting from the historical territorial organisation of mental health care, may partly explain the heterogeneity in the use of ECT, a treatment that is indicated in a limited number of clinical situations. Although this highly specialised treatment is not intended to be locally available, access to it must be facilitated by a better coordination of care, enabling better referrals, between hospitals in charge of regular psychiatric follow-up and those providing specialised care.

This study, documenting the use of ECT at a large scale in France, is a key prerequisite for a better understanding of medical practices. It now needs to be complemented by additional work, in particular through longitudinal and qualitative research. This will increase the evidence-base that can be transmitted to health professionals, individuals suffering from severe drug-resistant psychiatric disorders and their families, and, more generally, the general population, in order to make the best medical decisions and ensure patients' free and informed consent. The recurrent debates about the benefit-risk ratio of ECT call for regular updating of scientific data and clinical guidelines for this treatment, incorporating the viewpoints of the individuals who have undergone it. ♦

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