



Valproate prescribing practices for women with intellectual disability across Europe

Lance Watkins¹ | Markus Reuber² | Bhathika Perera³ | Ken Courtenay³ |
Roger Banks⁴ | Emma Murphy⁵ | Heather Angus-Leppan^{6,7} | Rohit Shankar^{8,9}

¹Neath Port Talbot CLDT and Specialist Epilepsy Service, Morriston, UK

²Academic Neurology Unit, University of Sheffield, Sheffield, UK

³Barnet, Enfield and Haringey Mental Health Trust, London, UK

⁴NHS England and NHS Improvement, London, UK

⁵INFACT - National Trust for Children Affected by Valproate and Other AEDs in Pregnancy, London, UK

⁶Royal Free London NHS Foundation Trust, London, UK

⁷University College London Queen Square Institute of Neurology, London, UK

⁸Cornwall Partnership NHS Foundation Trust, Truro, UK

⁹University of Exeter Medical School, Truro, UK

Correspondence

Rohit Shankar, Chy Govenc, Threemilestone Industrial Estate Highertown, Truro TR4 9LD, Cornwall, UK. Email: Rohit.shankar@nhs.net

Background: Valproate (VPA) is a known teratogen associated with greater risk of major congenital malformations and other neurodevelopmental sequelae than all other licensed antiepileptic medicines. To reduce the potential for VPA-related teratogenicity, the European Medicines Agency issued recommendations in 2018. Over two-thirds of women/girls with intellectual disability (ID) may have treatment-resistant epilepsy that could benefit from VPA treatment.

Aims: This investigation compared VPA prescribing practice for women/girls with ID between European countries, specifically evaluating the practice in the UK with that in other countries.

Methods: An expert working group with representation from key stake-holding organizations developed a survey for dissemination to relevant professionals across Europe.

Results: Seventy one responses were received (27 UK, 44 Europe). Clinicians in the UK were more likely to report that they are working to mandatory regulations compared with European respondents ($P = .015$). European respondents were less likely to be aware of user-independent contraception options ($P = .06$). In The UK, VPA regulations were more likely to be applied to women with ID than in Europe ($P = .024$).

Conclusion: There is heterogeneity in the application of VPA regulations across Europe for women/girls with ID. In both the UK and Europe, the regulations lack suitable adjustments for specific ID-related factors.

KEYWORDS

intellectual disability, pregnancy, regulatory guidance, teratogenicity, valproate

1 | INTRODUCTION

Valproate (VPA) is an established teratogen with an estimated risk of 10% major congenital malformation (MCM) and up to 40% neurodevelopmental disorders including autistic traits and cognitive deficits.^{1,2} The VPA MCM risk is influenced by dose and polypharmacy.³ Foetal anticonvulsant syndrome (FACS) and VPA embryopathy are

defined by developmental delay, attention deficits and intellectual disability (ID).^{4,5}

In February 2018, the European Medicines Agency (EMA) recommended that VPA should only be used in women of childbearing age if they have epilepsy that does not respond to other AEDs, and if they are enrolled in a pregnancy prevention programme ("PREVENT"). One month later, the Coordination Group for Mutual

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2020 The Authors. *Acta Neurologica Scandinavica* published by John Wiley & Sons Ltd

Recognition and Decentralised Procedures-Human (CMDh) endorsed new measures to avoid in utero valproate exposure.⁶ In the UK, the Medicines and Healthcare products Regulatory Agency (MHRA) updated its VPA prescription regulations to contraindicate VPA use in women/girls of childbearing age without restrictions.⁷ The UK regulations align with those proposed by the EMA.

1.1 | Girls/women with intellectual disability (ID)

Girls/women with ID require specific consideration. ID is commonly associated with comorbid epilepsy (22%), which is treatment resistance in over two-thirds of cases.⁸ In terms of seizure control, VPA remains the drug of first choice for generalized epilepsy.⁹ It has been shown to be effective in people with ID.¹⁰ A recent survey suggests a mean 30%-40% deterioration in seizure control when patients are changed from VPA to alternatives.¹¹ VPA also conveys mood stabilizing properties, which are particularly relevant in those with ID given the high prevalence of psychiatric comorbidities in this population.¹² A recent UK investigation examining the implementation of the MHRA statement at a tertiary epilepsy centre (N = 125) found that over one-third of women using VPA had an ID, and one-fifth could not consent to a sexual relationship. In one in three patients, VPA treatment did not comply with the MHRA regulations.¹³

The aim of this study was to gain an understanding of how measures to restrict VPA in girls/women of childbearing age with ID have been implemented and regulated in clinical practice across Europe. The investigation will compare VPA prescribing between Europe and the UK.

2 | METHODS

A working group was assembled comprising of expert members from the Faculty of Psychiatry of Intellectual Disability of the Royal College of Psychiatrists (RCPsych) (RS, KC and LW), International League against Epilepsy (ILAE) (MR), European Psychiatric Association, Mental Health in Intellectual Disability (EPA-MHID) Section (BP), European Association for Mental Health In Intellectual Disability (EAMHID) (RB), Association of British Neurologists (ABN) (HAL), and representation from INFAC (Independent Foetal Anticonvulsant Trust) and FACS Association (EM).

The STROBE checklist was used to guide reporting of this cross-sectional study. An initial draft questionnaire was prepared (LW) and refined by the working group over three rounds of consultations using a Delphi method. The finalized survey was sent electronically to key members of different stake-holding organizations across the UK and Europe for distribution among other members.

The survey questions focused on specific aspects of the current regulations governing VPA use and how these were applied to girls/women with ID of childbearing age (Supplementary Information 1).

The survey results were analysed as a whole and findings also compared between the UK and other European countries. Content analysis of the qualitative data was performed to identify themes. The z-score test was used to compare UK with other European responses, with a two-tailed hypothesis and significance accepted at $P < .05$. This study included European countries expected to take account of the EMA statement, even if they were not part of the European Union.

2.1 | Ethics

Participants were advised that participation was voluntary and that responses would be anonymized and analysed. No identifiable data were collected. Consent was implicit by participation.

3 | RESULTS

3.1 | Demographics

A total of 71 respondents representing 17 countries from a wide range of clinical specialties (Supplementary Information 2) responded. Twenty-seven of the 71 respondents were based in the UK. The majority of respondents (93%) work with girls or women with ID. VPA was prescribed for epilepsy (79%), bipolar affective disorder (51%), migraine (7%) or other psychiatric/behavioural presentations (9%).

3.2 | UK compared with Europe

3.2.1 | Quantitative data

The interpretation of regulations varies considerably between clinicians working in the UK and those working in other European countries (Table 1/Figure 1). A significantly higher proportion of UK-based clinicians reported they were working to mandatory regulations than in the other European countries, suggesting lower awareness levels of VPA-related regulations among European respondents or more flexible interpretation of the regulations. In this context, "mandatory" means "legally binding" (ie if mandatory prescribing rules are not followed, the medication is essentially used off-licence and without the usual medicolegal protections provided by the licensed use of the drug). In Europe, over one-third of clinicians were not aware of formal recommendations on user-independent contraception. This suggests that specific advice on highly reliable contraception may be offered less often in other European countries compared with the UK.

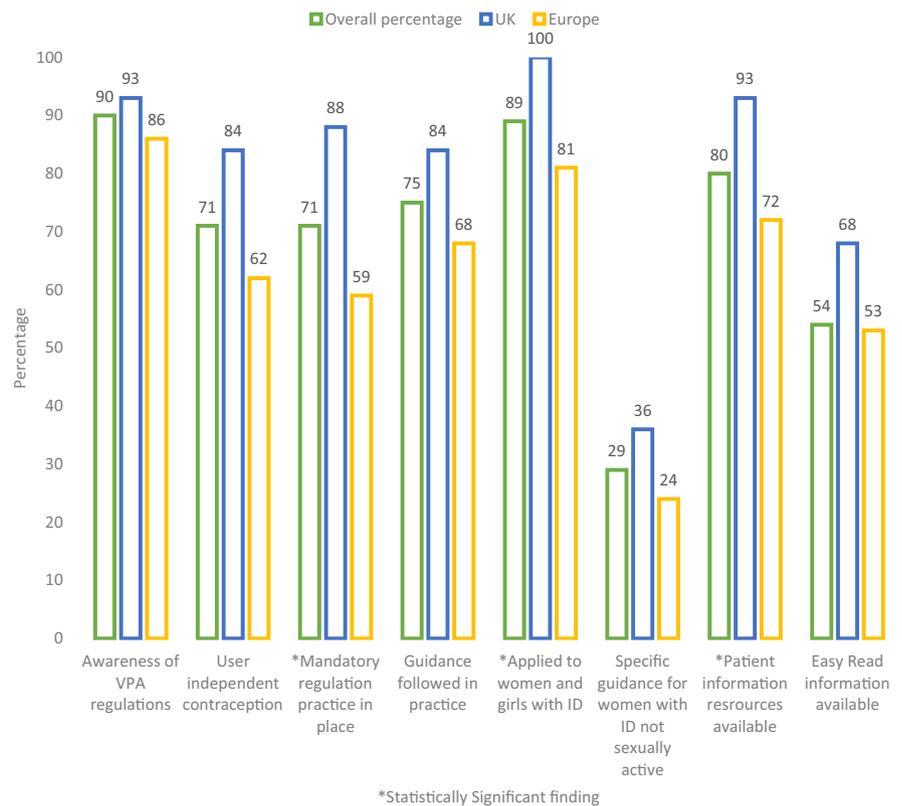
Self-reported compliance with regulations in women and girls with ID was greater in the UK compared with Europe. However, in both the UK and other European countries the majority of respondents (71%) reported a lack of specific guidance for prescribing VPA

TABLE 1 Comparison of respondents' views between UK and Europe

Parameter	Total sample (n = 71)**	UK	Europe	P value
Awareness of VPA regulations	63/70	25/27	37/43	.4009
Recommendation of acceptable forms of contraception	45/63	21/25	23/37	.06
Mandatory regulation in place	44/62	22/25	22/37	.015*
Guidance followed in clinical practice	47/63	21/25	26/38	.164
Applied to women and girls with ID	54/61	24/24	30/37	.024*
Specific guidance for women with ID who are not sexually active	18/63	9/25	9/38	.29
Patient information resources available	56/70	25/27	31/43	.037*
Patient information available in easy-read format	37/68	17/25	23/43	.24

*Significance at 0.05.

**Number of total respondents may differ as not all questions were answered.

FIGURE 1 Comparison between the UK and Europe

to girls or women with ID who are not sexually active with no difference between the UK and Europe.

In the UK, clinicians were more likely to report having access to patient information resources but “easy-read” patient information was no more likely to be available in the UK than other European countries.

3.2.2 | Qualitative data

Across European countries, 41% of respondents stated that they were working in regions without mandatory VPA prescribing regulation

for women and girls of childbearing age and 32% of respondents stated the prescribing guidelines that are in place for women are not followed in practice (Supplementary Information 2). A themed content analysis of free comment responses identified three distinct categories that suggest reasons for this lack of adherence.

Reasons for lack of adherence to VPA regulation:

1. Knowledge—there is a general lack of awareness of VPA regulations, more specifically regarding mental capacity, informed consent and how to assess more complex scenarios.
2. Treatment factors—clinicians and/or patients are hesitant to change effective AED treatment, particularly if it has been

difficult to achieve treatment success. The balance of risk is multifactorial and often based on a limited evidence base. For some, there may be a lack of suitable alternative treatments either because of previous failure, side effects, or due to access and financial constraints.

3. Ethical considerations—patient choice is often not considered within regulations, whether an individual can provide informed consent or not. Contraception advice may be inappropriate for people who are not sexually active, particularly girls/women with ID who may lack the mental capacity to consent to sexual activity.

European respondents consider a wide range of exceptional circumstances in which the prescription of VPA is necessary and appropriate in this population (Table 2). The exceptional scenarios raised are consistent with the expert opinion consensus amalgamated in the UK.¹⁴

4 | DISCUSSION

The survey results demonstrate heterogeneous interpretation, regulation and implementation of VPA EMA guidelines for childbearing-age girls/women across Europe.

The regulations described in the responses from across Europe can be classified into four categories, with category 3 being the most common and consistent with the EMA and UK-MHRA regulations.

Categories (1-4) of VPA regulation currently in place around Europe based on clinician feedback.

1. No guidance—unaware of EMA warning
2. No guidance—aware of EMA warning
3. Do not prescribe for girls or women of childbearing age with exceptions and restrictions
4. Do not prescribe for girls or women of childbearing age without exception

Regulation adherence appears more rigid in the UK than in Europe. However, in the UK, clinicians still lack a clear understanding of the regulations, which make no specific reference to patients with ID. Not all UK respondents were aware that the regulations are mandatory; some (9/25) stated there is specific guidance for people with ID who are not sexually active, although this is not actually included in the regulation. For those not sexually active because of their disabilities, participation in a user-independent contraceptive programme could add unnecessary risk and lead to emotional distress to both individuals and their families. In Europe, a proportion of clinicians reported that, where regulation is in place, it may not be followed, particularly for women with ID. Specifically, there is a lack of understanding of mental capacity assessment.

The EMA recommendations lack consideration of specific ID-related factors including the following: individuals who lack the mental capacity to provide informed consent to sexual relationships;

Pooled European respondents' views from experience	EMA recommendations
<i>Exceptional circumstances</i>	<i>Exceptional circumstances</i>
<ul style="list-style-type: none"> • Life-threatening situations, for example status epilepticus. • Patient choice with valid informed consent with pregnancy prevention. • Patient choice with valid informed consent without pregnancy prevention. • Women who lack the capacity to consent to sexual relationships • Treatment failure with other AEDs. • Intolerable side effects from other AEDs. • Specialist choice as most appropriate treatment given clinical scenario balancing risk and outcomes. 	<ul style="list-style-type: none"> • Alternative treatments are not suitable, specialist consultation required
<i>Restrictions</i>	<i>Restrictions</i>
<ul style="list-style-type: none"> • Teratogenic risk must be discussed • Pregnancy test prior to prescribing • Adherence to appropriate contraceptive regime (user-independent) • Do not consider VPA for anything other than epilepsy (eg Bipolar affective disorder) • Any women prescribed to be placed on a register 	<ul style="list-style-type: none"> • Pregnancy prevention programme <ol style="list-style-type: none"> a. assessment of pregnancy potential b. pregnancy tests before and during treatment as needed c. Counselling on risks of VPA and need for effective contraception during treatment d. annual review with specialist e. risk acknowledgement form • Educational materials • Alert card • No prescribing for migraine or bipolar during pregnancy

TABLE 2 Comparison between EMA recommendations and exceptional circumstances and prescribing restrictions pooled from European responses

TABLE 3 Valproate shared decision-making tool—Girls/women with ID

Level of ID	Mild (Pathway 1)	Moderate to profound (Pathway 2)
Valproate prescribing	Assessment of capacity to provide informed consent to AED treatment	Unable to provide informed consent to AED treatment and therefore prescribed in best interests, potentially involving patient advocate/representative.
Information sharing	Risks and benefits of VPA prescription for individual and unborn child. Unborn child: 10% risk of MCM's, up to 40% risk of neurodevelopmental and cognitive sequelae of varying degree. Risks dose-dependent and increased with polypharmacy. Risk to individual: common side effects include weight gain, tremor and rarely polycystic ovary syndrome. Risk is higher with higher dose. Risk of stopping medication: increased seizure frequency, injury, hospitalization, SUDEP and serious harm to unborn child if pregnant.	Information should be shared as suitable to the cognitive and communication needs of the individual to help support understanding. This will be guided by the person and those close to them (family/carers). Support may include longer appointments, easy-read documentation or involvement from other healthcare professionals with specialist ID expertise.
Contraceptive advice	Capacity to consent to sexual relationships and sexually active/or the possibility of becoming sexually active If yes, for further discussion around the "Prevent" programme. User-independent contraception, some of which are invasive If no, move to follow Pathway 2.	Unable to provide informed consent to sexual relationship No need for further discussion around contraception and sexual relationships that could cause distress.
Outcome	Risk acknowledgement form to be signed by epilepsy service and individual, enrolment in "Prevent," minimum annual review with a specialist	Risk acknowledgement form to be completed, opting out of "Prevent" programme

individuals who are not sexually active; and easy-read/accessible information. The same deficits are apparent in the UK regulations.¹⁵

4.1 | Limitations

The survey response rate was low considering the number of potential responders. Information derived from a single respondent may not have been representative and therefore could be biased towards the views of those with an interest in this field. The discussion of European results is based upon respondents' views in practice and not a review of regulations.

The results of this survey demonstrate heterogeneity in the application of VPA regulations across Europe for women/girls with ID. In both the UK and Europe, the regulations lack suitable adjustments for specific ID-related factors. From these findings, we conclude that improvements are needed in four areas to optimize the safe use of VPA in women with ID and epilepsy.

Recommendations for women/girls of childbearing age with ID

- Education**—increase clinician awareness, develop knowledge and improve regulation adherence.
- Regulations**—explicit exceptional circumstances where VPA may be appropriate should be identified. Provide clear guidance/pathways on switching from VPA to alternatives and how decisions for individuals with ID should be considered.
- Surveillance**—establishes national VPA registers for all VPA child-bearing women/girls.
- Shared decision-making**—arrangements at local level for decision-making to involve the patient or patient representative. The clinical decision-maker should have sufficient expertise to weigh up the risks and benefits of VPA treatment and use of safe contraception using accessible information, including documents in easy-read format to facilitate patient participation in decision-making (Table 3).

ACKNOWLEDGEMENTS

None.

CONFLICTS OF INTEREST

MR has received an educational grant from UCB Pharma and speaker's fees from UCB Pharma, Eisai and LivaNova outside the submitted work. EM is the Managing Director of INFACT, the National Trust for children affected by valproate and other AEDs in pregnancy. HAL is a member of the Epilepsy Advisory Group of the Association of British Neurologists, has been an Association of British Neurologists representative on the MHRA Valproate Stakeholders' Network meeting (2018) and UK representative on the Sanofi European Valproate Educational Programme Advisory Board (2018). She holds Eisai Investigator initiated non-pharmaceutical grants (2017) and has received Honoraria for non-promotional lectures from Eisai (2017, 2019) and UCB (2016). HAL's research salary is partly supported by the National Institute Health Research and Royal Free Charity. RS is a stakeholder of the "SUDEP and Seizure Safety Checklist." RS is a principal developer and key stakeholder of EpSMon. RS has received institutional and research support and personal fees from LivaNova, UCB, Eisai, Special Products, Bial and Desitin outside the submitted work. LW, BP, KC and RB have no conflict of interest to report.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Heather Angus-Leppan  <https://orcid.org/0000-0001-7004-3848>
Rohit Shankar  <https://orcid.org/0000-0002-1183-6933>

REFERENCES

- Weston J, Bromley R, Jackson CF, et al. Monotherapy treatment of epilepsy in pregnancy: congenital malformation outcomes in the child. *Cochrane Database Syst Rev*. 2016;11:CD010224.
- Meador KJ, Baker GA, Browning N, et al. Fetal antiepileptic drug exposure and cognitive outcomes at age 6 years (NEAD study): a prospective observational study. *Lancet Neurol*. 2013;12(3):244-252.
- Tomson T, Battino D, Bonizzoni E, et al. Comparative risk of major congenital malformations with eight different antiepileptic drugs: a prospective cohort study of the EURAP registry. *Lancet Neurol*. 2018;17(6):530-538.
- Ornoy A. Valproic acid in pregnancy: how much are we endangering the embryo and fetus? *Reprod Toxicol*. 2009;28(1):1-10.
- Bromley RL, Baker GA, Clayton-Smith J, Wood AG. Intellectual functioning in clinically confirmed fetal valproate syndrome. *Neurotoxicol Teratol*. 2019;1(71):16-21.

- European Medicines Agency. Valproate and related substances. EMA/145600/2018.2018. http://www.ema.europa.eu/ema/index.jsp?curl=pages/medicines/human/referrals/Valproate_and_related_substances/human_referral_prac_000066.jsp&mid=WC0b01ac05805c516f. Accessed 06 October 2020.
- Medicines and Healthcare Products Regulatory Agency. New Measures to avoid valproate exposure in pregnancy. 2018 <https://www.gov.uk/guidance/valproate-use-by-women-and-girls>. Accessed 06 October 2020.
- Royal College of Psychiatrists. Prescribing anti-epileptic drugs for people with epilepsy and intellectual disability. Available at <https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr206.pdf?sfvrsn=4db7a660>. Accessed 06 October 2020.
- Marson AG, Burnside G, Appleton R, et al. The SANAD II study of effectiveness of valproate or levetiracetam in generalised and unclassifiable epilepsy: an un-blinded randomised controlled trial [abstract]. 33rd International Epilepsy Congress, June 22 to 26, 2019 Bangkok. 2019;1027.
- Doran Z, Shankar R, Keezer MR, et al. Managing anti-epileptic drug treatment in adult patients with intellectual disability: a serious co-nundrum. *Eur J Neurol*. 2016;23:1152-1157.
- Angus-Leppan H, Moghim MM, Cock H, Kinton L, Synnott Wells M, Shankar R. Valproate risk form- surveying 215 clinicians involving 4775 encounters. *Acta Neurol Scand*. 2020;141(6):483-490.
- Turky A, Felce D, Jones G, Kerr M. A prospective case control study of psychiatric disorders in adults with epilepsy and intellectual disability. *Epilepsia*. 2011;52(7):1223-1230.
- Davies P, Reuber M, Grunewald R, et al. The impact and challenges of the 2018 MHRA statement on the use of sodium valproate in women of childbearing age during the first year of implementation, in a UK epilepsy centre. *Seizure*. 2020;79:8-13.
- Angus-Leppan H, Shankar R, Cock H. Valproate, women, and exceptional circumstances. *BMJ*. 2018;28(362):k3625.
- Watkins L, Cock H, Angus-Leppan H, Morley K, Wilcock M, Shankar R. Valproate MHRA guidance: limitations and opportunities. *Front Neurol*. 2019;10:139.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Watkins L, Reuber M, Perera B, et al. Valproate prescribing practices for women with intellectual disability across Europe. *Acta Neurol Scand*. 2020;00:1-6. <https://doi.org/10.1111/ane.13337>