**‘Advanced Paramedic Practice: Research Evidence Underpinning Paramedic Praxis for Epilepsy in Pregnancy.’**

**Abstract**

The purpose of this article is to provide a theoretical overview for advanced paramedics and those working in the ambulance service and general practice of the potential implications of pregnancy for women living with epilepsy. In particular the article has been written to specifically raise awareness of the implications of anti-epileptic drugs for both mother and child. Evidence of the data surrounding pregnancy outcomes for paramedics who work with women with epilepsy are incorporated into the paper as a means of highlighting the risk that they face during gestation. Emphasis is placed on the use of anti-epileptic drugs and their relative contribution to the implied risks that women living with epilepsy in pregnancy face. Most importantly it summarises official guidelines on the classification system of epilepsy to illustrate how the most appropriate anti-epileptic drugs are be selected. Paramedics are actively helping to inform collaborative decision making in women with epilepsy through the provision of accurate evidence based information and this article supports that by presenting the available published evidence in the field. The addendum to the article provides space for paramedics to consider the specialist needs of their patient caseloads where the optimal outcome is minimisation of risk factors that could lead to harm to women with epilepsy.

 **Keywords**

Epilepsy | Pregnancy | Anti-Epileptic Drugs | Paramedics | Seizures |Maternal Health |Pre-eclampsia

**Key Points**

1. Two thirds of women with epilepsy will not see an increase in the severity or number of seizures they experience during pregnancy. For the remaining third who do, this represents an important opportunity for paramedics to support the medical management of women with epilepsy in everyday practice. It ought also to be recognised that pregnant women with pre-eclampsia and eclampsia may also have seizures.
2. Women who experience an increase in the severity and number of seizures are at a small but statistically significant risk of adverse pregnancy outcomes such as antepartum and post-partum haemorrhaging, spontaneous miscarriage, and a consequent increase in the likelihood of an induced delivery, the need for C-section and the incidence of pre-term births of less than 37 weeks gestation.
3. Paramedics play an invaluable role in facilitating and empowering women to carefully optimise their likelihood of a positive pregnancy outcome by supporting the individualised management and by providing them with information, which enables them to make informed decisions about their condition and their pregnancy status.

**‘Epilepsy in Pregnancy: Building Capacity for the Optimal Care of Women in Paramedic Practice’**

**Introduction**

An operational definition of epilepsy, is important so that paramedics can best understand their potential roles in the emergency care of women with who are pregnant. For the purposes of this article, *epilepsy* will be defined as a heterogeneous neurological condition, originating from the brain that results in the clinical manifestation of seizure (Kwan and Brodie, 2010). In addition to this*, Status epilepticus* is operationally defined as seizure activity lasting for longer than thirty minutes in duration, without regaining consciousness, although as yet there is insufficient evidence to claim that pregnant women diagnosed with epilepsy are more likely to progress to Status epilepticus than their non-pregnant counterparts (ibid, 2010). Paramedics working directly with women with epilepsy should be aware that the epilepsies are a heterogeneous group of brain diseases with the common feature of seizure (Pitkänen, et al, 2017; Lu et al, 2016). A single seizure does not lead to the automatic diagnosis of epilepsy. This is usually done following successive seizures, which ensures an accurate diagnosis and classification of the specific type of epilepsy can be made. The occurrence of seizures can have a huge impact on the quality of life of patients, alongside their physical and emotional wellbeing (Artama et al, 2017).

Formal diagnosis of epilepsy can be largely dependent on the length of time of the seizure, their typical clinical manifestation and the overall frequency with which they occur (Bell, 2017; Krishnamurthy, 2017). It also ought to be noted that in paramedic practice, women who are pregnant and who have pre-eclampsia and eclampsia may also have seizures (Phipps et al. 2019). Depending on when they do occur, seizures can also impact on the implications of potential injury to the person living with the condition, which can often impose additional concern for in women with epilepsy who become pregnant. The interrelationships between all of these factors is significant in ensuring that the pharmacological management of the condition can be established and maintained and one which necessitates understanding by paramedics who care for these women in the context of clinical emergency settings (Perucca, Scheffer and Kiley, 2018).

High quality meta-analysis has ensured provision and articulation of tangible evidence in relation to the varying maternal and foetal outcomes in women living with a diagnosis of epilepsy, who become pregnant (Hernández‐Díaz, 2017; Viale et al, 2015) . This research reveals that these women are at a small but statistically significant risk of adverse pregnancy outcomes such as antepartum and post-partum haemorrhaging, spontaneous miscarriage, and a consequent increase in the likelihood of an induced delivery, the need for caesarean section and the incidence of pre-term births of less than 37 weeks gestation (Hernández‐Díaz, 2017; Viale et al, 2015). All of these are significant considerations for paramedics who may be called to any of these situations as an integral part of their roles as first line responders in clinical emergencies.

The aim of this article is to provide accessible information to paramedics that can be pragmatically articulated to women with epilepsy during pregnancy. This may concern their emergency transfer to obstetrics and gynaecology, which is necessary, so having an optimal level of underpinning knowledge for the specialist care of these women is the main focus of continuing professional development (CPD). It is also of utmost importance that paramedics act only within the permissible scope of their own clinical professional discipline and that within their own scope of practice paramedics remain aware of the need to refer patients to their registered midwife, obstetrician or registered medical professional (Woollard, 2015; HCPC, 2014). What remains outstanding for acknowledgement here is the specialist expertise of consultant neurologists who specialise in the prescription management of anti-epileptic drugs (Stoian and MacDonald, 2017).

**Typical Clinical Presentations of Pregnant Women with Epilepsy in Primary and Secondary Care**

There is a clear need to support and facilitate women’s empowerment in making informed choices as they living with epilepsy prior to and during pregnancy. The Royal College of Obstetricians and Gynaecologists (2016) recommends that it ought to be recognised that two thirds of women with epilepsy will not see an increase in the severity or number of seizures they experience during pregnancy in relation to the evidence currently available (RCOG, 2016). Close monitoring during and active planning of pregnancy is key to these positive outcomes as the optimal time that women can live free of seizures is a key prognostic determinant. Pregnancy outcomes are also linked to the classification of epilepsy women are diagnosed with by their neurological consultants. The Royal College of Obstetricians and Gynaecologists (2016) reviewed evidence that identified of the women who have been seizure free in the 9 – 12 months prior to conception, that between 74 -92% of them remain free of seizures during pregnancy, depending on the classification of epilepsy with which they have been diagnosed.

INSERT Table 1: Clinical Presentation of Epilepsy and Risk Posed to Pregnancy

**The Need for Multi-Agency Approaches to the Care of Women with Epilepsy in Pregnancy**

Standardising and significantly improving the number of women with epilepsy during pregnancy who have positive outcomes in the form of their own health and wellbeing and a healthy baby, was a key recommendation of the MBRRACE-UK (Confidential Enquiries into Maternal Deaths and Morbidity) Report (Knight et al, 2018). Whilst sudden expected death in epilepsy (SUDEP) is a characteristic of poorly controlled epilepsy, the potential for avoidable death is clear and addressing the lack of multi-agency support and guidance in primary and secondary healthcare for women with epilepsy has been recognised as a fundamental mechanism in redressing this balance (Razaz et al, 2017). Paramedics play a pivotal involvement in this support as they are most likely to be called in an instance where a woman with epilepsy has a seizure.

 **The Articulation of Benefit and Risk in Ante-natal Care**

One of the major concerns regarding pregnancy for women with epilepsy is the risk of congenital malformation of the foetus and the interrelationship of pharmacological management regimens for the control of seizures. Being realistic about making choices which actively contribute to the likely outcome of a healthy pregnancy and acting within scope of practice are pivotal for all paramedics (HCPC, 2014). It is where maternal concern for risk to the unborn child psychologically outweighs the need to preserve their own health that the discontinuation or reduction of anti- epileptic drugs often occurs, which in the worst possible scenarios can lead to sudden unexpected death of the mother and consequently the unborn child (Einarsdottir, Sveinsson and Olafsson, 2019; Devinsky et al, 2018). It is this perception of the risk of teratogenicity which contributes most greatly to this and understanding the relative benefits and risks of continuing an optimal pharmacological management regimens are pivotal to every woman (Eadie, 2019). Sodium valproate, and carbamazepine have been highlighted as the most common anti-epileptic drugs, which increase this risk of teratogenicity and even some of the most historical research reveals that as a consequence of this, more than 15% of women prescribed sodium valproate discontinue it, without medical supervision in pregnancy (Lawther et al, 2018). Sodium valproate is often determined as the best form of control for some pregnant women with epilepsy in instances where the benefit of their use in stabilising and preventing seizures outweighs the risk of their teratogenicity (Eadie, 2019). In these instances, counselling women can be a significant means of protecting the health and wellbeing of women and their unborn children who may otherwise decide to suddenly stop taking or reduce the dose of their medication without formal medical supervision and guidance (Kinney et al, 2018; Landmark et al, 2017).

**The Potential for Increased Multi and Interprofessional Working in the Care of Women with Epilepsy**

MBRRACE-UK findings on maternal deaths due to epilepsy explicitly identified the need for enhanced collaborative working between obstetricians, midwives and epilepsy specialists in pregnancy (Knight et al, 2018). Being able to refer quickly back to midwifery, obstetrics and GP services, enables specialist management to be accessed more efficiently, in particular neurologists whose clinical speciality is epilepsy, who work with epilepsy specialist nurses to support women living with epilepsy in pregnancy (Stoian and MacDonald, 2017). Continuity of high quality care is another area for focus and at present there are a limited number of studies that can evidence primary care focus by allied healthcare care practitioners such as paramedics and nursing staff on women with epilepsy (Leach et al, 2017). Addressing this through strategic approaches to building capacity within and between professional disciplines can only be a positive move in person centred epilepsy care, beyond the context of pregnancy.

**Optimal Advice beyond Childbirth: Manageable Challenges for Women with Epilepsy**

Carefully managing and maximising the potential of women to experience a healthy pregnancy whilst they live with epilepsy, is the responsibility of all paramedics who come into contact with women with epilepsy. From a pragmatic perspective this entails recommending that all women ought to consult medical specialists before altering medication levels either when planning to become pregnant or during pregnancy so that optimal care pathways for them can be encouraged. Expectant mothers may also have more specific questions related to their potential of being able to breastfeed whilst taking anti-epileptic drugs, to care for their children and also the most appropriate mechanisms of contraception beyond the birth.

Providing optimal healthcare for women with epilepsy in pregnancy entails consideration of how they perceive their potential roles as mothers is altered by the condition. In the majority of cases this is founded on the maternal belief that due to epilepsy they may not be able to fulfil all of the roles of motherhood to the benefit of the child (Atarodi-Kashani et al, 2018). Indeed it is now posited that the use of risk assessment tools ought to be used to ensure women can align their choices with the potential risks to their own health and that of their unborn child (Shankar et al, 2018). What is important here, is the pragmatic minimisation of risk, the reality of high risk activities such as water depth when bathing, for either the mother or the child and to encourage a sense of perspective on what being a mother with epilepsy actually means in everyday living. Empowering women to be pragmatic, realistic and less anxious are the most fundamental mechanisms of encouraging positive outcomes, where risk is an everyday concern for all parents, regardless of whether they live with a long term medical condition Shankar 2018). Being able to make informed decisions, independently and with due regard for the safety and wellbeing of their children and having support where needed from the context of healthcare providers seems a pragmatic solution to this. Research reveals that 87% of women would like to be actively provided with information and counselling about the risks of anti-epileptic drugs to their unborn children, so that their new knowledge of the subject can contribute to their informed decision making (Lawther, et al 2018). Whilst paramedics are not involved in counselling, they can offer straightforward information and support to all pregnant women with epilepsy, in reassuring them about their condition until it is possible to handover to specialist healthcare services in neurology, obstetrics and midwifery (Burrell, Noble and Ridsdale, 2013).

**Prescribing Practice for Women with Epilepsy and Implications for Paramedic Practice**

Equity and parity of care for women with epilepsy during pregnancy remains disparate across the UK (RCOG, 2016). There has historically been no standardisation of care for the specific needs of these women and this is particularly true of the preconception period and in the early stages of pregnancy where optimal care is paramount to the best prognostic outcomes and indicators (Patel and Pennell, 2016). Fundamental to this infrastructure is the implementation of a hierarchy of evidence in relation to epilepsy research so that this becomes accessible to women with epilepsy and their families during such a vulnerable period of their lives.

**Conclusion**

Offering women with epilepsy information concerning expectations of their pregnancy outcomes is both a powerful means of supporting them as they make informed decisions and also supporting them through the additional challenges that living with epilepsy during pregnancy can entail. The importance of medically managed pre-conception care is a central message that all paramedics ought to reinforce with women and girls of childbearing age, when the conversation arises, so that they can make informed choices about their continued use of pharmacological agents. Wherever possible this ought to take place in formal appointments with medical practitioners, neurological consultants and specialist epilepsy nurses who can give individually tailored support and advice to women with epilepsy. The positive impact of pragmatic advice cannot be underestimated and can minimise risk to women with epilepsy and their unborn children. Whilst sudden death of women with epilepsy remains one of the most devastating consequences, it ought to be highlighted to women living with the condition that this is mainly an outcome of uncontrolled epilepsy and that it may be potentially avoidable in the vast majority of cases. For allied healthcare practitioners, epilepsy in pregnancy and in particular pre-conception planning periods, all provide invaluable opportunities to reinforce and facilitate medically advised care, which can be fundamental to positive outcomes for mothers and their children. Understanding types of epilepsy, their presenting symptomology and the treatment and management interventions associated with them, are all pivotal to the effective pharmacological support and management that paramedics can credibly provide.

**Areas for Critical Reflection in Working with Pregnant Women with Epilepsy and their Families and Carers – Reflective Questions**

1. Identify any fundamentally wrong assumptions/beliefs that you may have had, regarding pregnancy and epilepsy. How might you apply this to practice in best serving women with epilepsy in everyday paramedic practice?
2. Reflect on the information that you would give a woman with epilepsy if she disclosed to you that she had suddenly stopped taking sodium valproate without medical advice.
3. How would you prioritise the information that you give to women with epilepsy about their medication in paramedic practice? Establish a hierarchy of five important things you would like to prioritise regarding their continued medication use whilst pregnant.

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