

Alison Wohler Commonwealth Honors Program

Introduction

- Approximately 3.4 million people in the world are living with epilepsy, and 470,000 of them are children.
- Pediatric seizures can be difficult to control, as treatment options are limited to high doses of antiepileptic drugs, which do not always work.
- Patients who do not respond to conventional treatments are forced to consider alternative therapies for their child's safety.



Background

- There are five kinds of seizures: genetic, structural, metabolic, immune related, and infection.
- Acute seizures can occur as a result of disease, trauma, or infection, that can be treated.
- Chronic seizures can also be referred to as epilepsy, which is life long.
- Status epilepticus is a type of seizure that lasts longer than five minutes or clusters together one after another.
- An electroencephalogram (EEG), MRI, or CT scan may be done to diagnose a seizure disorder.
- Goals for seizure treatments are "no seizures, no side effects."
- Seizures can put a strain on promoting the child's growth and development, as seizures often cause damage to brain cells.
- Treatment can put a strain on a family financially with frequent hospital visits and expensive medication regimens.
- Balancing the needs of other family members can also be difficult with a chronically ill child.

Materials and Methods



- This systematic review of the literature was done to identify the effectiveness of the ketogenic diet in controlling seizures in pediatric patients.
- The articles chosen had to include the pediatric population specifically.
- The database Cumulative Index of Nursing and Allied Health Literature (CINAHL) Plus with Full Text was used.
- A Boolean search was conducted using the words pediatric seizures AND diet, as well as ketogenic diet AND pediatric seizures.
- My first search did not have date parameters.
- An eighteen-year-old article was omitted as it was not relevant, and the search was narrowed down to the years of 2014-2020.
- Current, up to date research was needed to determine the efficacy of the ketogenic diet.



Results/Themes

- The ketogenic diet was effective in reducing seizures whereas the low glycemic index diet was not.
 - Janak Nathan reports as much as 50% reduction in seizure activity for some patients.
 - Susan O'Conner reports that the ketogenic diet was successful for patients with various EEG patterns with both general and focal seizures.
 - The low glycemic index diet is less restrictive allowing for a higher carbohydrate intake, which is not optimal for seizure control.
- Parents view quality of life differently than the children with seizure disorders and this can impact diet adherence.
 - Parents report that the reduction in seizure activity has had a positive impact on life in the home
 - Children feel that the diet creates more restrictions in their life, which makes them feel isolated. The side effects can be undesirable for children as well.
 - Sama Boles found that parents and children can spend more time together planning out meals and grocery shopping.
- Compliance with diet changes is a significant concern in this patient population.
 - Food preferences change as a child grows, which can make compliance with this diet difficult.
 - The diet can be given enterally through a feeding tube, intravenously, as well as an addition to breastfeeding.
 - Loss of ketosis, and ultimately loss of seizure control can occur if patients do not adhere to the diet.
- How this diet interacts with medications alters other body functions must be considered when using the ketogenic diet for seizure management.
 - The components of this diet rely heavily on the liver to be metabolized, which poses a risk for liver damage.
 - Medication use may need to be adjusted because many contain large amounts of carbohydrates which is contraindicated on the ketogenic diet.
 - A basic metabolic panel of labs need to be monitored in order to maximize ketosis.

Discussion

- The ketogenic diet has been shown to be effective, but kids are not a fan of it.
- Parents see the diet as a way for their children to be seizure free,
- The type and amount of fats needed in the diet has yet to be determined.
- Parents must decide if the risk to their child's overall health is worth the seizure control.

Conclusion

- The ketogenic diet has shown evidence that it is effective for seizure control, with the right type of fats, as well as strict compliance.
- The diet has been shown to work well in patients with chronic, uncontrollable seizure disorders.
- The diet is not for everyone, as the side effects can be undesirable for patients.
- Positive implications include bringing families closer together and making treatment family oriented.
- As nurses, this evidence can be used to inform practice and improve compliance with the knowledge of the diet's success in improving seizure control.

References

- Amari, A., Turner, Z., Rubenstein, J. E., Miller, J. R., & Kossoff, E. H. (2015). Exploring the relationship between preferences for high fat foods and efficacy of the ketogenic and modified Atkins diets among children with seizure disorders. *Seizure*, 25, 173-177. doi:https://doi.org/10.1016/j.seizure.2014.11.001
- Boles, S., Webster, R. J., Parnel, S., Murray, J., Sell, E., & Pohl, D. (2020). No improvement in quality of life in children with epilepsy treated with the low glycemic index diet. *Epilepsy & Behavior*, 104, 106664. doi:https://doi.org/10.1016/j.yebeh.2019.106664
- Janak, N., Bailur, S., Datay, K., Sharma, S., & Khedekar Kale, D. (2019). A Switch to Polyunsaturated Fatty Acid Based Ketogenic Diet Improves Seizure Control in Patients with Drug-resistant Epilepsy on the Mixed Fat Ketogenic Diet: A Retrospective Open Label Trial. *Cureus*, 11(12). doi:http://dx.doi.org/10.7759/cureus.6399
- Le Pichon, J. B., Thompson, L., Gustafson, M., & Abdelmoity, A. (2019). Initiating the ketogenic diet in infants with treatment refractory epilepsy while maintaining a breast milk diet. *Seizure*, 69, 41-43. doi:https://doi.org/10.1016/j.seizure.2019.03.017
- Lin, J.-J., Lin, K.-L., Chan, O.-W., Hsia, S.-H., & Wang, H.-S. (2015). Intravenous Ketogenic Diet Therapy for Treatment of the Acute Stage of Spontaneous Symptomatic Epilepsies in a Pediatric Patient. *Pediatric Neurology*, 52(4), 442-445. doi:https://doi.org/10.1016/j.pediatrneuro.2014.12.008
- O'Connor, S. E., Richardson, C., Trescher, W. H., Byler, D. L., Sather, J. D., Michael, E. H., & Zuperc-Kania, B. (2014). The Ketogenic Diet

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