# A Brief Review on Brain Maturation of Preterm Infants

Abstract

Premature birth can have lasting effects on the brain development and psychological health of individuals. This paper reviews a study that used a normative brain age model to compare the brain structure and function of preterm and full-term adolescents using magnetic resonance imaging (MRI). The study found that preterm adolescents had reduced volume and thickness in some grey matter regions, but increased volume and thickness in others, possibly due to age differences. Preterm adolescents also had higher brain age scores and higher rates of psychological disorders than full-term adolescents. The paper discusses the implications of these findings for understanding the neurodevelopment consequences of premature birth and the potential interventions to improve the outcomes of preterm infants.

Introduction

The brain is the core of every single human being, without it our bodies would be unable to carry out vital, life-sustaining tasks. But what happens when the brain isn’t given proper time to grow and mature before birth? How does it affect the individual later in life? These are the two main questions I went searching for an answer to when I began reading the article. The authors began by laying out several percentages and factors such as preterm infant mortality and, more importantly in the case of my questions, risks of neurodevelopmental impairment. The researchers in this article use a “normative ‘brain age’ model” (Kelly et al.) by using MRIs to get a more in-depth look at the volumes/thickness of sections of the brain that are important in the development of adolescents. The study found that while there was decreased volume and thickness in several grey matter regions, some regions, such as the frontal and occipital regions, showed increased volume and thickness. However, the researchers did clarify that this was likely due to the age differences in the preterm and control subjects used, leaving more questions than answers for me in this regard. Outside of just the physical effects on the maturation of the brain of preterm infants, the researchers also examined the psychological side. The researchers found that while preterm infants were more likely to be diagnosed with a psychological disease, like autism spectrum disorder, later in life, they were also more likely to have a higher brain age than their full-term counterparts. The reasoning behind this was not explored in depth, unfortunately.

Recent Progress

While there is not much that can be done to prevent premature birth in human babies, further research on neurological and physical development will help to understand more of what exactly will happen if a baby is born prematurely, and how it will affect them later in life. This research will also help to further the limits of how we can help to accommodate and treat premature children so that they can have an easier, less risky development and growth stage. Through studying a premature infant's brain, we may also learn more about why premature babies are more likely to experience hearing, learning, and visual impairments, and how to treat the impairments so that they will have a less negative effect on the infant later on.

Discussion

I will begin by stating that this was a highly informative, interesting article to read, and I believe it has furthered my knowledge of the differences in brain development between premature infants and infants that went full term. This being said it did almost entirely focus on the physical aspects of development and not much on the psychological side which, to me, was a bit odd considering that this was strictly studying the brain and such things are usually included in such studies. Being shown the psychological effects of the physical development differences would have been a wonderful opportunity to draw a link between these things and give possible reasonings for things that we are still not entirely sure the cause of. Much of the data also seemed to be in direct opposition to other sets, this was never brought up and was more than likely found to be due to differences in age of the subjects. While several things were a bit frustrating within the article for the most part it was a well-organized study that found the answers its researchers had very well, it merely did not answer most of *my* specific questions which is not the fault of the article and more of my own for misinterpreting what it was. Overall, it is a very educational and fascinating piece.

Works Cited

Kelly, Claire, et al. “Investigating Brain Structural Maturation in Children and Adolescents Born Very Preterm Using the Brain Age Framework.” NeuroImage, vol. 247, Feb. 2022. EBSCOhost, https://doi.org/10.1016/j.neuroimage.2021.118828.