



Investigating Pediatric Acute Lymphoblastic Leukemia Treatment Effects on Neurocognitive Development

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Introduction

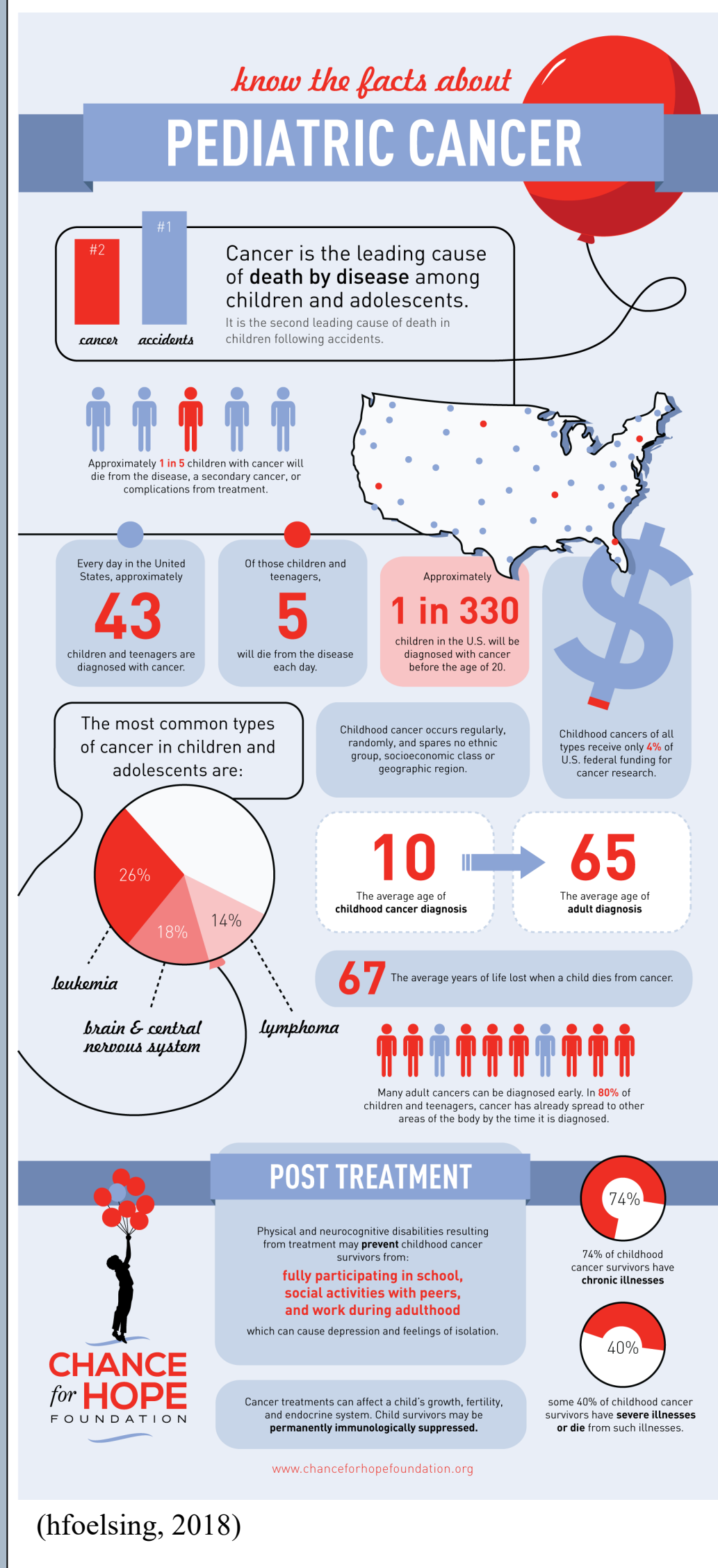
- The problem at hand is if treatment for Acute Lymphoblastic Leukemia affects neurocognitive development later in life for pediatric cases.
- Acute Lymphoblastic Leukemia (ALL) is defined as a blood cancer where there are too many lymphoblast or immature white blood cells in the blood and bone marrow according to the National Cancer Institute (*NCI Dictionary of Cancer Terms*, 2022).
- Neurocognitive development is defined as how the brain develops to think and reason according to the National Cancer Institute (*NCI Dictionary of Cancer Terms*, 2022). Neurocognition includes things such as attention, memory, information processing, and understanding.
- In the United States alone nearly 3,000 children and adolescents will be diagnosed with ALL yearly (*Acute Lymphoblastic Leukemia (ALL)*, 2022).
- That shows many children are getting the diagnosis of ALL so it is important to understand if neurocognitive issues are most likely to occur later in life and how one can address these issues.

Background and Significance

- In the United States alone nearly 3,000 children and adolescents will be diagnosed with ALL yearly (*Acute Lymphoblastic Leukemia (ALL)*, 2022).
- ALL is the most common childhood cancer representing 26% of all childhood cancers (Hfoelsing, 2018).
- 20-40% of those that survive ALL have neurological deficits later in life depending on treatment protocol (Kizilocak & Okcu, 2019).
- This causes a significant problem for society because as these children develop, they will suffer from the effects treatments have left on them which can lead to neurocognitive issues later.
- According to St. Jude Children's Research Hospital on average children cancer treatment can last more than three years and can cost 425,000 USD (*Our unique operating model*, 2021).
- The issue is significant to nursing practice because we have to offer the support and guidance in how to overcome/ease the neurocognitive effects that these children will be faced with as the mature into adults.

Purpose Statement

Does treatment of pediatric acute lymphoblastic leukemia affect neurocognitive development? If so, does a certain treatment plan have more effect?



(hfoelsing, 2018)

Findings

In research and studies surrounding neurocognitive development of children treated for pediatric ALL similar findings have been observed. Those that have received treatment for ALL as a pediatric patient have had neurocognitive development issues occur as an effect of treatment (Turhan et al., 2017). Different treatment protocols have different effects on the cognitive deficit that occurs in patients later in life.

- Children diagnosed with cancer are placed into risk groups based on how high risk their cancer prognosis is. Based on Ashford's study, regardless of the risk group there is a cognitive deficit in those treated (Ashford et al., 2010).
- Attention is affected by treatment of ALL in children and specifically the areas of focus, sustained attention, and vigilance (Koener et al., 2019).
- Children treated with just chemotherapy do not show as much of a neurocognitive deficit as those that are treated with cranial radiation therapy (CRT) as well (Krull et al., 2013).
 - Impairment for those without CRT was 15.9%.
 - Impairment for those with CRT was 31.7%.
- Younger children at diagnosis have a stronger neurocognitive deficit as do females and those that have had a relapse in cancer (Freycon et al., 2022).
- Prophylactic intervention including cognitive training and academic monitoring is the best prevention method for late term affects but does not mean that they still will not occur (Turhan et al., 2017).

Conclusions and Nursing Implications

The studies revealed that different ALL treatment protocols have worse effects on neurocognitive development specifically to the younger population as they are developing more. They also showed that there is a major attention and memory deficit as a result of treatment since all studies focused on these subcategories of neurocognition. As nurses must face these issues, we can implement referrals to neuropsychologists to provide the necessary interventions of these late effects (Koener et al., 2019). Further research is needed to access what intervention the nurse must provide aside from providing support to the patient and family as they try to navigate the challenges related to post treatment of pediatric cancer. I am hopeful that this information is an eye opener to the realness of post treatment cognitive effects. Just because a child's cancer battle is over does not mean their battle is over. These children have a lifetime of cognitive issues to overcome as they grow into adulthood.

Literature Review

- Five articles were selected from online databases, such as PubMed, ACS Journals, and MDPI. Access was granted to these online articles using my university library.
- The articles consisted of quantitative and qualitative studies.
- Key words searched included pediatric ALL, neurocognitive development, treatments of ALL, impacts after remission.
- Inclusion criteria: survivor of pediatric ALL.
- Exclusion criteria: publication date and peer-review status.
 - All articles were published between 2010-2022 and were also peer-reviewed.

References

Scan QR code for list of references used in this paper and research.



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