

ORIGINAL

## Analyzing the Emotional Health Challenges in Pediatric Cancer Survivors after Treatment

### Análisis de los retos de salud emocional en supervivientes de cáncer pediátrico tras el tratamiento

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#### ABSTRACT

Under the age who have been diagnosed with cancer and have been treated, quite often completing treatment, but enduring some long-lasting effects. Their experiences reveal the necessity of continuous attention from medical practitioners and psychological services to improve the patients' quality of life and help them come back to normal activities. To investigate the post treatment emotional health challenges encountered pediatric cancer survivors and analysis on such factors as treatment modalities, age at diagnosis, and types of cancer; focused on factors that could influence the school reintegration and parent's emotional health with pediatric cancer survivors. The participants consisted of 98 pediatric cancer survivors and data was obtained using the Child Health Questionnaire (CHQ) which focused on their emotional health challenges and psychological experiences after treatment. SPSS 26 version software has employed for analyzing descriptive statistics, correlation, and chi-square tests to evaluate demographic differences and determine factors associated with psychosocial outcomes. The results show that school reintegration after treatment contributed to the mental health issues of child cancer survivors at 60 % and age at diagnosis at 45 %. Further, these specific difficulties were due to the type of cancer, which was 30 %, treatment modalities 35 % and 35 % of parents' mental health. These findings stress the importance of implementing appropriate support strategies to survivors and their families to enhance their reintegration and improve the mental health of Children in post treatment rehabs.

**Keywords:** Pediatric Cancer; Emotional Health; School Reintegration; Parental Emotional Health; Survivors; Child Health Questionnaire (CHQ).

#### RESUMEN

Los menores de edad a los que se les ha diagnosticado cáncer y han recibido tratamiento, a menudo lo completan, pero padecen algunos efectos duraderos. Sus experiencias revelan la necesidad de una atención continua por parte de los profesionales médicos y los servicios psicológicos para mejorar la calidad de vida de los pacientes y ayudarles a volver a sus actividades normales. Para investigar los retos de salud emocional post-tratamiento que encuentran los supervivientes de cáncer pediátrico y el análisis de factores como las

modalidades de tratamiento, la edad en el momento del diagnóstico y los tipos de cáncer; se centró en los factores que podrían influir en la reintegración escolar y la salud emocional de los padres con supervivientes de cáncer pediátrico. Los participantes fueron 98 supervivientes de cáncer pediátrico y los datos se obtuvieron mediante el Cuestionario de Salud Infantil (CHQ), que se centró en sus problemas de salud emocional y experiencias psicológicas tras el tratamiento. Se empleó el software SPSS versión 26 para analizar las estadísticas descriptivas, la correlación y las pruebas de chi-cuadrado para evaluar las diferencias demográficas y determinar los factores asociados a los resultados psicosociales. Los resultados muestran que la reintegración escolar tras el tratamiento contribuyó a los problemas de salud mental de los niños supervivientes de cáncer en un 60 % y la edad al diagnóstico en un 45 %. Además, estas dificultades específicas se debían al tipo de cáncer, en un 30 %, a las modalidades de tratamiento, en un 35 %, y a la salud mental de los padres, en un 35 %. Estos resultados subrayan la importancia de aplicar estrategias de apoyo adecuadas a los supervivientes y sus familias para mejorar su reintegración y mejorar la salud mental de los niños en rehabilitación tras el tratamiento.

**Palabras clave:** Cáncer Pediátrico; Salud Emocional; Reintegración Escolar; Salud Emocional de los Padres; Supervivientes; Cuestionario de Salud Infantil (CHQ).

## INTRODUCTION

Cancer can strike any region of the body and affect people of all ages. Single cells first undergo genetic alteration, which develops into a mass (or tumor) that spreads to other areas of the body and, if untreated, can be fatal.<sup>(1)</sup> The great majority of child cancer has no recognized etiology, in contrast to cancer in adults. The pediatric cancer caused by several factors it could be environmental or lifestyle factors are responsible for only a small percentage of pediatric cancer.<sup>(2)</sup> Efforts to prevent childhood cancer should concentrate on behaviors that will shield the children from adult cancer that can be prevented. Early detection increases the possibility that cancer will respond to appropriate treatment, increasing the probability of survival, reducing suffering, and frequently lowering treatment costs and intensity.<sup>(3)</sup> Early cancer detection and prevention of care delays can significantly enhance the lives of children with cancer. The type of cancer has an exclusive treatment plan that can involve surgery, radiation therapy, and chemotherapy, a proper diagnosis is crucial when treating children with the disease.<sup>(4)</sup> To provide the correct treatment, a correct diagnosis is required to determine the kind and severity of the condition. Typical treatments include radiation therapy, chemotherapy, and surgery.<sup>(5)</sup> A committed, multidisciplinary team is needed to provide children with the extra care. The team is crucial for their continuous physical and cognitive development, as well as their nutritional health. There are disparities and inequalities in access to effective diagnosis.<sup>(6)</sup> Nearly 80 % of children with cancer can be cured when childhood cancer services are available. Focusing on the emotional wellbeing of children who are pediatric cancer survivors, there is even more reason to understand the issues that the targets are possible to face.<sup>(7)</sup> These concerns of emotional health need to be accepted and addressed by concerned parties, especially the health care givers, to help the patients achieve their goal of total recovery and enhance their living standard.<sup>(8)</sup> To investigate the emotional health challenges faced by pediatric cancer survivor's post-treatment, identifying factors that influence their psychological well-being and resilience.

The National Cancer Institute initiated the Childhood Cancer Data Initiative (CCDI) suggested to gathering and disseminating data from all children and young adults (AYA) with pediatric cancer diagnoses, the effort hopes to advance knowledge, enhance survivability rates, and expedite the creation of novel treatments.<sup>(9)</sup> The survivor service offered by Children's Oncology Group (COG) institutions suggested 73 % of the 209 universities that received the survey in 2017 finished. In standard pediatric oncology clinics or specialist late effects programs, 96 % of institutions offer treatment to children who have survived childhood cancer. But in a survival clinic, only 29,8 % of institutions saw more than 75 % of eligible patients.<sup>(10)</sup> Data about childhood cancer survivorship can be shared and analyzed for Survivorship Portal provided 400 million genetic variations and more than 1,600 phenotypic characteristics from more than 7,700 survivors.<sup>(11)</sup> The impacts of platinum-based chemotherapy, age, limb amputation, mental health, and a new MAGI3 haplotype have all been investigated using the portal. To underscore the value of long-term follow-up (LTFU) care for children who have survived cancer, with a focus on promoting wellness, early identification, and intervention to reduce onset problems a novel approach was performed.<sup>(12)</sup> A follow-up strategy was conducted that includes risk-based systems screening, proactive health supervision, and counseling from medical professionals. Improved physical and mental health, better survival rates, and an organized and efficient healthcare model were achieved. The subsequent difficulties faced by pediatric cancer survivors highlight the need for specialist being alive care. Although the majority of children cancer survivors have minimal psychological issues, some are more likely to develop treatment-related side effects later in life.<sup>(13)</sup> Suicidal thoughts and health concerns are more common among these survivors, and

associated with feelings of physical limits, late effects, and pain from cancer. For understanding the availability and barriers to survivorship care the treatment strategy was proposed with a survey was conducted that helped to improve long-term follow-up services.<sup>(14)</sup> The descriptive statistics evaluated the survivor effectiveness. The outcomes confirmed that the percentage of treatment summaries improved from 31 % in to 88 % in indicated both advancements and continued difficulties in the treatment approach. By implementing person-centered survivorship care, the research could improve the overall wellness and overall standard of life of childhood cancer survivors.<sup>(15)</sup> The approach was created in conjunction with 14 partners from 10 nations, consists of an online lifestyle counselling program and a guideline-based care system. The effectiveness of costs, survivor autonomy, and viability will all be evaluated by survivors. The results confirmed that replication manuals would be accessible and long-lasting improvements in care.

## METHOD

The methodology begins with data collection from 98 pediatric cancer survivors, where the CHQ is used to assess their psychosocial experiences and emotional health challenges after treatment. The analysis was conducted using SPSS version 26, utilizing descriptive statistics, correlation analysis and chi-square tests to explore differences in demographics and potential risk factors for psychosocial outcomes. The methodology emphasizes the significant impact that demographic factors have on the mental health of pediatric cancer survivors. Figure 1 indicates the methodological overview of emotional health assessment in pediatric cancer survivors.

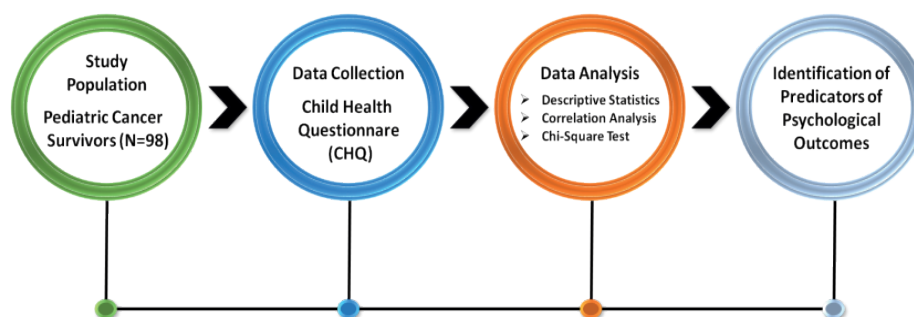


Figure 1. Methodological overview of emotional health assessment in pediatric cancer survivors

### Data collection

The data collection process consisted of recruiting 98 pediatric cancer survivors who have completed their treatment. Each participant was assessed with the CHQ, created to measure different psychosocial experiences and emotional health problems. Parents or guardians provided informed consent prior to participation. The CHQ was given in a disciplined manner whereby every participant was guided to answer the survey in the same way. The data collection process was using SPSS version 26.

### Research instrument

The CHQ is a common tool employed for purposes of research and evaluation of children and adolescent's wellness focused living standard and the behavioral conditions. There are many dimensions appeared includes physical, social and emotional functioning, and behavioral problems, which makes it possible to assess the health status of a child in all aspects. The CHQ is designed to evaluate the perspectives of both the child and the parent, which helps to delve into the emotional health problems that children with cancer undergo after treatment. It incorporates validated scales that use to measure psychosocial outcomes and in turn measure any subsequent changes making it a core research tool in problems associated with the treatment of cancer in children that imposes on their social psychological wellbeing.

### Child Health Questionnaire (CHQ)

The CHQ is a detailed measuring instrument which aims to evaluate not only a child's physical and psychological wellbeing but also the quality of life enjoyed and overall health status. It involves participation of parents or other caregivers in providing several health-related information's including the functional state, symptoms accompanied by daily routines.

Table 1. Questions from the CHQ for Pediatric Cancer Survivors.	
Variables	Questions
Treatment Modalities	What type of treatment did receive for cancer? How satisfied are with the treatment received for cancer?
Age at Diagnosis	At what age were diagnosed with cancer? How do think age at diagnosis affected feelings about illness?
Type of Cancer	What type of cancer was diagnosed? How has type of cancer influenced experiences during treatment and recovery?
School Reintegration	How easy was it for to return to school after treatment? Do you feel that school environment supports emotional health and well-being?
Parental Emotional Health	How would describe parents' emotional state during treatment? Do you think parents' emotional health has impacted emotional well-being treatment?

Table 1 is an indication of some questions from the CHQ that will be used to measure the different dimensions of emotional health challenges in pediatric cancer survivors. Each of these variables' treatment modalities, age at diagnosis, type of cancer, school reintegration and parental emotional health contain two directed questions. These questions seek to gain an understanding on how such factors affect the psychosocial experiences and general post treatment well-being of the survivors surviving these conditions. The structured questions will aid in better understanding the emotional status of the survivors and how to help them. For the Child Health Questionnaire, a 3-point Likert scale could include response options such as "Disagree", 'Neutral' and 'Agree'. This type of simplified model can response scale that provides a means for the completion of all items relating to health and psychosocial experiences by indicating whether one holds a particular statement partially, moderately or fully. It ensures that the data collection process is made easy and efficient while lessening the burden on respondents.

### Statistical analysis

When performing statistical analysis on health-related issues encountered by the pediatric population suffering from and treated for cancer, focus group discussions will include Chi-square tests, correlation and descriptive statistics. Descriptive statistics will summarize the demographic and psychosocial features of the survivors comprehensively. By including chi square tests relationships between some of the categories for example types of cancer and emotional disturbance levels can be made. Correlation studies are useful in determining the correlations between variables such as treatment results, age at diagnosis, and emotional health in pediatric cancer. These analyses will be done using the SPSS version 26, a centrally used program for health research statistical analysis.

## RESULTS AND DISCUSSION

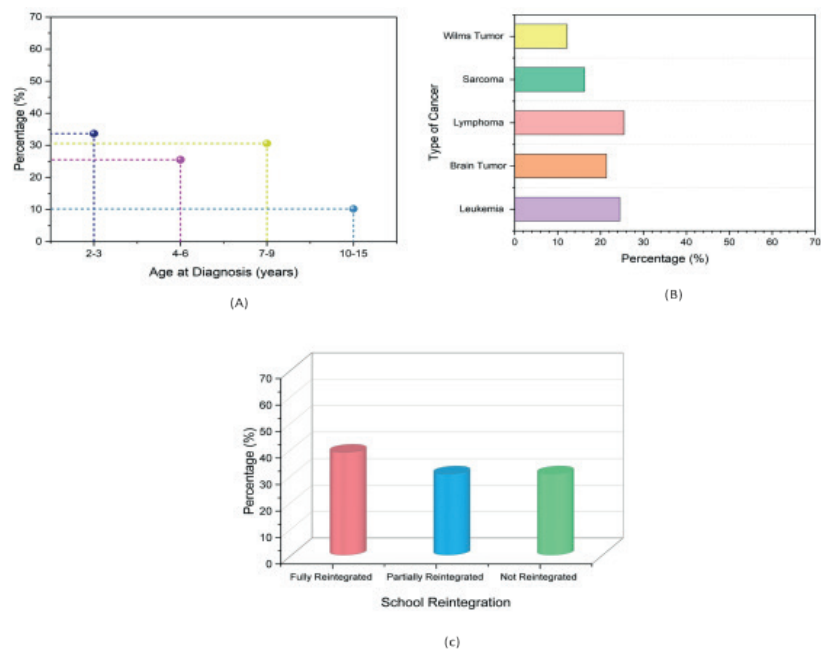
The analysis brings the fact that there are significant differences in the mental health of pediatric cancer survivors owing to various demographic factors, which brings out the different psychosocial hurdles which is overcome. In the concern, it is important to be cognizant of them so that the survivors can be helped for going through these challenges. There were significant differences in emotional health found based on demographic characteristics, signifying the need for intervention. These findings illustrate the diversity of recovery among pediatric cancer formers and the need for a supportive infrastructure.

### Demographic statistics

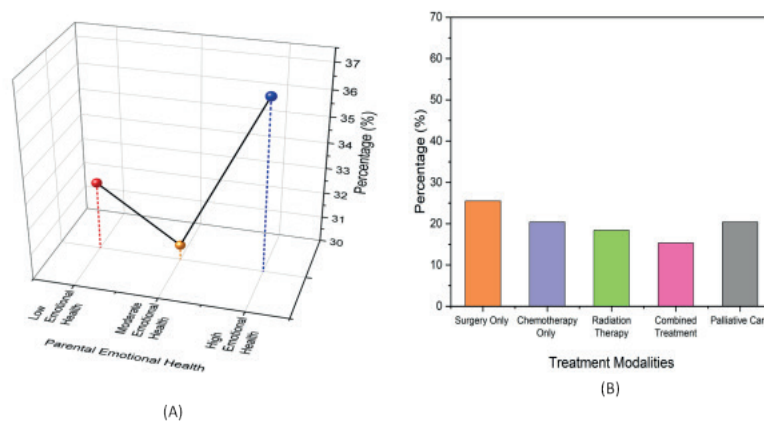
The demographic variable for pediatric cancer survivors is presented in table 2 and figure 2 & 3. It classifies the respondents according to treatment procedures, age at diagnosis, and types of cancer, school reintegration and emotional health status of parents. Each category contains frequency counts and percentages which describe the distribution of survivors in various demographic factors. Such information is crucial for determining the demographics and estimating any potential psychological repercussions following cancer treatment.

Table 2. Demographic Characteristics of Pediatric Cancer Survivors.			
Demographic Variables		Frequency (n =98)	Percentage (%)
Treatment Modalities	Surgery Only	25	25,5
	Chemotherapy Only	20	20,4
	Radiation Therapy	18	18,4
	Combined Treatment	15	15,3
	Palliative Care	20	20,4

Age at Diagnosis (years)	2-3	33	33,7
	4-6	25	25,5
	7-9	30	30,6
	10-15	10	10,2
Type of Cancer	Leukemia	24	24,5
	Brain Tumor	21	21,4
	Lymphoma	25	25,5
	Sarcoma	16	16,3
	Wilms Tumor	12	12,2
School Reintegration	Fully Reintegrated	38	38,8
	Partially Reintegrated	30	30,6
	Not Reintegrated	30	30,6
Parental Emotional Health	High Emotional Health	36	36,7
	Moderate Emotional Health	30	30,6
	Low Emotional Health	32	32,7



**Figure 2.** Demographic statistics of (A) Age at Diagnosis (B) Types of Cancer (C) School Reintegration



**Figure 3.** Demographic statistics of (A) Parental Emotional Health (B) Treatment Modalities

### Descriptive statistics

The demographic characteristics and emotional health outcomes of children with cancer who have completed treatment are summarized through descriptive statistics. Researchers can help provide the range and main features of the data by performing some calculations, namely, means, medians, frequencies and percentages.

Variables	Treatment Modalities	Age at Diagnosis (years)	Type of Cancer	School Reintegration	Parental Emotional Health
Mean	12,86	11,3	3,2	3,3	2,6
Median	14,5	11	3	4	3
Standard Deviation	3,99	4,8	0,9	0,8	1,0
Minimum	6	4	1	2	1
Maximum	27	22	4	4	4

Table 3 provides a number of descriptive statistics related to health for 98 pediatric cancer survivors after their treatment. The mean scores show the assessment of treatment modalities, age at diagnosis, type of cancer, school reintegration, and parental emotional well-being. The standard error gives an idea of the spread in the responses whereas the minimum and maximum values show the limits of different variables. These statistics shed light on the psychological aspects of the population and are of highest necessity in designing any support interventions.



**Figure 4.** Correlation Coefficients for Health Challenges in Pediatric Cancer Survivors

Figure 4 illustrates the interconnections between numerous variables that pertain to pediatric cancer survivors. The favorable associations delivered that the growth in one variable corresponds with the improvement of another variable while negative correlations offered the opposite. The emotional health of parents has a strong positive correlation with returning to school which indicates that if the parents are in good emotional health, their children will have an easy time going back to school. To find that cancer types have some negative associations, meaning that some cancer types could be associated with poor performance in certain areas.

### Chi-square test

The Chi-Square Test is a statistical approach used to test the relationships between categorical variables and its application among other, treatment and outcomes, in pediatric cancer survivors is one of the hypotheses for the examination. Its aim is to determine if the variability of some factors, such as reintegration of children to schools and level of emotional health of their parents, is random or bears some significance for the population.

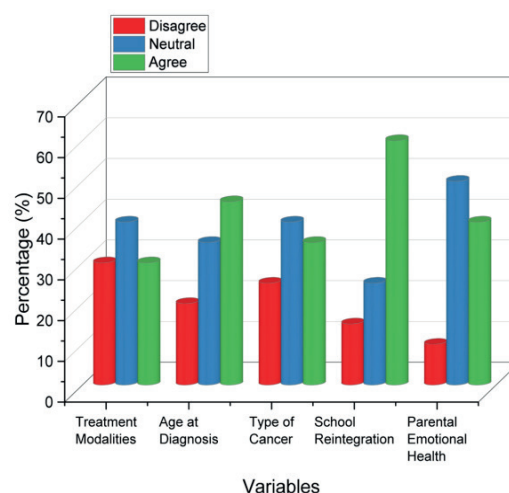


Variables	Treatment Modalities	Age at Diagnosis	Type of Cancer	School Reintegration	Parental Emotional Health
Observed (O)	15	25	10	20	28
Expected (E)	19,0	19,0	19,0	19,0	22,0
(O - E)	-4,0	6,0	-9,0	1,0	6,0
(O - E) <sup>2</sup>	16,00	36,00	81,00	1,00	36,00
(O - E) <sup>2</sup> / E	0,842	1,895	4,263	0,053	1,636

Table 4 displays the results of the Chi-Square test, which was conducted to compare the actual and projected numbers for different health challenges experienced by pediatric cancer survivors' post-treatment. The observed counts for each variable correspond to the data that was actually gathered, while the expected counts correspond to the population total. The table exhibits in addition the disparity of the values (O - E) as well as the sum of the squares of the mentioned variations and the contribution of each of the variables to the general value of chi square. The final value of the chi-square is important in determining the impact of the variables on each other and underlines possible areas of concern in health challenges experienced by the survivors.

#### *Likert scale*

The CHQ employs a three-point Likert type scale which invites responses that reflect agreement or satisfaction for certain health or wellbeing statements.



**Figure 5.** Distribution of Responses on Factors Related to Cancer Treatment and Support

The analysis of the survey data shed light on differences in the opinions that people have regarding treatment methods, age at which several cancers are diagnosed and other patient-related factors shown in figure 5. Integration back into the school system has been depicted positively, which indicates a major backing towards the inclusion of the children within the post treatment time frame. There is a combination of positive and negative aspects of the parental emotional health, which supports the fact that the family is going through tough moments and emotional support is needed. All in all, the results show the varying feelings and experiences that comprise cancer treatment and its effects on patients and their families.

#### **CONCLUSION**

Once cancer treatment is completed, the pediatric cancer survivors do not escape its significant emotional health effect that also tend to vary with their demographic factors. The analysis explored a number of survivorship issues particularly relating to, treatment modalities, and age at diagnosis, and parental emotional health in shaping the experiences of survivors. Such factors need to be addressed effectively, through appropriate support mechanisms to enhance school re-entry and improve general psychological health. The findings show that school reintegration affects emotional health challenges in pediatric cancer survivors at 60 %, age at

diagnosis is 45 %. Other treatment modalities account for 30 %, type of cancer 35 % and maternal emotional health 40 %. In addition, help for the cancer survivors and their relatives needs to be offered in a continually supportive manner to lessen the possible psychological disturbances that can be posed by the treatments over time. Finally, nurturing resilience and provision of all-encompassing services will help in the management of diseases in the early period and also improved the quality of life of children with cancer. Some limitations of the research include availability of retrospective data, since it was based on self-reports; thus, there is a potential risk of bias limited sample size, which would restrict how far the findings can be applied. Future scope should to cover wider, more heterogeneous populations for example methodology combining qualitative and quantitative analysis or longitudinal studies that would investigate how the emotional health of pediatric cancer survivors' changes across time.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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