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QUALITY OF LIFE, PHYSICAL ACTIVITY LEVEL AND DIETARY BEHAVIORS OF PARENTS OF CHILDREN WITH CANCER

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Abstract:
The quality of life of parents of children with cancer has been a topic of research in the international literature, whereas no research data yet for parents in Greece has been noticed. The purpose of this study was to examine the impact of childhood cancer on the quality of life, dietary habits, and the level of participation in physical activities of their parents. The sample of the present study was 24 parents (14 women, 10 men), from FLOGA foundation from different regions of Greece aged 38-60 years. To conduct the present study, 3 questionnaires were administered to parents, that is, the SF-36 Quality of Life Questionnaire (Ware, Kosinski, & Keller, 2001), the Physical Activity (PA) questionnaire (Godin & Shephard, 1985) and the "Dietary Behaviors" questionnaire (Bebetsos *et al.*, 2000). The statistical analysis involved the use of the Statistical Package for Social Sciences (SPSS 29.00). The results of the research showed statistically significant differences based on the age of both parents and children, the marital status of the parents, the existence of parental health problems and parental health status and profession. Overall, the positive factors related to parental quality of life were identified and discussed. Future research with larger samples is needed to draw in-depth conclusions.

Keywords: parents, childhood cancer, quality of life, exercise, diet

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1. Introduction

Cancer refers to a group of diseases resulting from changes in cells caused by gene mutations that control cell function, specifically how they grow and divide. Cancer cells, instead of dying as they should, continue to divide uncontrollably, transforming a healthy cell into a cancerous one, with damaged DNA (Berumen *et al.*, 2018).

Childhood cancer differs significantly from cancer in adults, with its most common types involving leukemias, brain cancer, lymphomas and solid tumors, such as neuroblastoma and Wilms tumors (Kourti *et al.*, 2023; Siegel *et al.*, 2023). Moreover, medical progress has determined that childhood cancer has remarkably high cure rates in developed countries compared to adults (Botta *et al.*, 2022).

2. Literature Review

The impact of childhood cancer affects not only the quality of life of children but also that of their family members especially their parents (Kim & Given, 2008). Parents of children with cancer report lower quality of life as determined by their personal perception of the positive and negative aspects of their lives. The difference in quality of life compared to parents with healthy children is apparent, can be both physical and psychosocial and depends on factors such as the child's health status (Klassen *et al.*, 2008), the intensity of treatment (Salvador *et al.*, 2015) and the time associated with diagnosis (Klassen *et al.*, 2011).

Physical health problems frequently reported by parents of children with cancer include issues such as anorexia, weight gain or weight loss due to unhealthy or improper diets, whereas physical and social functioning, sleep disturbances, and poor mental health have also been described (Baş *et al.*, 2021).

Regular exercise can positively impact the health and quality of life of these parents, providing additional support and improving both their physical and psychological well-being (Cuthbert *et al.*, 2018). Diet, exercise, health, and quality of life are closely interconnected. A healthy, balanced diet promotes good quality of life, helps maintain normal body weight, and strengthens the immune system (Brown *et al.*, 2016).

Although interventions related to exercise and proper diet positively affect these quality of life areas (Xu *et al.*, 2018), few studies on these factors have focused on the profile of parents having children with cancer. Quite clearly, this issue has not yet been thoroughly examined (Halliday *et al.*, 2017). Thus, the purpose of this study was to examine the effect of childhood cancer on the quality of life, dietary habits, and level of physical activity participation of parents of children with cancer.

3. Material and Methods

The sample consists of 24 participants (aged 38-60 years), all parents (14 mothers, 10 fathers) of children with cancer. Participants were recruited from various cities in Greece

and their participation was anonymous and voluntary. All parents were members of the FLOGA Childhood Cancer Foundation association from different cities, which involves children dealing with cancer and their families.

The measurement tools used in this study, included: *The SF-36 Quality of Life Questionnaire* (Ware, Kosinski, & Keller, 2001), which evaluates individual perceptions across eight domains, that is, physical functioning, role limitations due to physical health problems, bodily pain, general health perceptions, vitality (energy/fatigue), social functioning, role limitations due to emotional problems, and mental health. These domains are grouped into two main categories of general physical health and general mental health. Scores range from 0 to 100, with higher scores indicating a better quality of life, whereas responses are rated on a scale from 1 to 5, with 1 indicating the worst and 5 indicating the best quality of life. SF-36 covers both positive and negative aspects of health, which is considered a significant advantage for a quality-of-life assessment system. *The Godin-Shephard Leisure-Time Exercise Questionnaire* (Godin & Shephard, 1985), that measures leisure time (mild, moderate or vigorous) participation during the last week and *the Dietary Behavior Questionnaire* (Bebetsos *et al.*, 2000), examining the degree to which the participant feels confident in replacing unhealthy dietary habits with healthy ones. Responses are on a 10-point Likert scale, ranging from (1) not confident at all to (10) very confident.

Initially, a telephone call was made to FLOGA representatives who facilitated contact with parents of the association in various cities. This initial contact resulted in the study sample consisting of 24 parents who agreed to participate. Next, parents were informed about the research process and purpose, with emphasis given to their voluntary and anonymous participation. Questionnaires were completed either via telephone or through Google Forms completion of the questionnaires. Explanations were provided by the researcher when needed, whereas the average questionnaire completion time was 15 minutes. The study protocol and procedures were approved by the Internal Ethics Committee of DPESS, University of Thessaly (protocol number 1-8/7.2.2024).

Statistical analysis included the use of the SPSS version 29.0. The analysis included a) Pearson correlation analysis among factors, b) non-parametric Mann-Whitney U test to identify differences in factors based on gender, parental age, child age (child, adolescent), smoking status (yes, no), marital status (single, married) and health problems (yes, no) and c) non-parametric Kruskal-Wallis test to locate differences in factors based on education, occupation, health and body mass index. The significance level was set at $p < .05$.

4. Results and Discussion

Pearson r correlation analysis revealed positive correlations among many of the questionnaires' factors (Table 1).

Table 1: Pearson r correlations

	N	1	2	3	4	5	6	7	8	9	10	11	12
1. Total activity score	24												
2. Weekly activity score	24	.563**											
3. Diet	24	.393	.662**										
4. Physical functioning	24	.196	.090	.301									
5. Role physical	24	.00	-.161	-.011	.273								
6. Vitality	24	-.037	-.166	.057	.292	.471*							
7. General health	24	-.075	-.206	-.029	.219	.106	.523*						
8. Mental health	24	.143	-.100	.043	.158	.204	.671**	.549**					
9. Role emotional	24	-.271	-.314	-.214	.233	.326	.490*	.591**	.227				
10. Bodily pain	24	0	.042	.317	.470*	.669**	.529**	.525**	.490*	.407**			
11. Social functioning	24	0	-.305	-.069	.241	.536**	.653**	.405*	.777**	.376	.571**		
12. General physical health	24	.007	-.071	.210	.572**	.616**	.623**	.735**	.541**	.550**	.938**	.599**	
13. General mental health	24	.004	-.204	.021	.296	.480*	.881**	.898**	.888**	508*	.640**	.895**	.713**

p* < .05, p**< .001

Application of Mann-Whitney U analysis revealed statistically significant differences between parents of children with cancer and parents of adolescents with cancer (Table 2)

Table 2: Mann-Whitney U Analysis of parental perceptions according to the age of children

Variables	N	Parental perceptions according to children's age	Mean Rank	Mann-Whitney U	Asymp. Sig.
Vitality	11	Children	9.20	37,000	.040
	13	Adolescents	14.15		
General health	11	Children	9.5	38,500	.027
	13	Adolescents	15.04		
Mental health	11	Children	9.45	38,000	.025
	13	Adolescents	15.08		
Role emotional	11	Children	9.95	43,500	.026
	13	Adolescents	14.65		
General mental health	11	Children	8.85	33,500	.025
	13	Adolescents	14.42		

Mann-Whitney U results also showed statistically significant differences between parents (of 38-49 and 50-60 years old) (Table 3).

Table 3: Mann-Whitney U Analysis Results of Parental Age

Variables	N	Parental age	Mean Rank	Mann-Whitney U	Asymp. Sig.
Vitality	11	38-49	8.86	31,500	.016
	13	50-60	14.88		
General health	11	38-49	9.00	33,000	.013
	13	50-60	15.46		
Mental health	11	38-49	9.32	36,500	.021
	13	50-60	15.19		
General mental health	11	38-49	8.95	32,500	.019
	13	50-60	14.79		

Statistically significant differences were also noticed between single and married parents in weekly activity scores (Table 4).

Table 4: Mann-Whitney U Analysis Results of Marital Status

Variable	N	Marital Status	Mean Rank	Mann-Whitney U	Asymp. Sig.
Weekly activity score	2	Single	21.25	4,500	.032
	22	Married	11.70		

The presence or absence of a parental health problem produced statistically significant results in the same variable (weekly activity score) (Table 5).

Table 5: Mann-Whitney U Analysis by Parents' Health Problem Presence

Variable	N	Health problems	Mean Rank	Mann-Whitney U	Asymp. Sig.
Weekly activity score	5	Yes	17.70	21,500	.030
	19	No	11.13		

The non-parametric Kruskal-Wallis analysis revealed statistically significant differences regarding parental health (Table 6).

Table 6: Kruskal-Wallis Results of Parental Health

Variables	Very good (N = 6)	Good (N = 15)	Moderate (N = 3)	p
Role physical	11,17	13,80	8,67	.013
General health	18,50	11,93	3,33	.008
Role emotional	14,92	13,47	2,83	.009
Bodily pain	12,25	14,47	3,17	.028
Social functioning	12,58	14,30	3,33	.035
General physical health	14,92	13,43	3,00	.041

Finally, non-parametric Kruskal-Wallis analysis exhibited statistically significant differences regarding parental occupation (Table 7).

Table 7: Kruskal-Wallis Results by Parents' Occupation

Variable	Public Sector (N = 3)	Private Sector (N = 14)	Unemployed (N = 7)	p
Physical functioning	6,00	15,43	9,43	.041

The purpose of this study was to examine the perceptions of parents with children diagnosed with cancer regarding their quality of life, dietary habits and levels of physical activity. Results revealed parental and children's age, parental health problems and condition, married status and parental occupation as the main demographic characteristics producing significant perception differences.

The strong positive correlation between weekly activity score and overall activity score suggests that regular physical activity is associated with improved general health. Incorporating exercise into the daily routine can positively impact the health of parents with children diagnosed with cancer, who often face issues like sleep disturbances and poor mental health (Halliday *et al.*, 2017). Healthy eating was linked to higher levels of physical activity that result in weight control and improved mobility since a positive correlation between dietary habits and weekly activity scores was noted, with overall healthy habits of exercise and nutrition contributing to a better quality of life for parents (Klassen *et al.*, 2008; Brown *et al.*, 2016).

Physical functioning was associated with less reported body pain - physical discomfort and positive general physical health as well as social functioning, meaning that good physical functionality contributes positively to overall physical health, highlighting the importance of physical activity for health and socialization purposes. The ability to perform physical activities without limitations was also positively linked to vitality, indicating that those who are unrestricted in their physical roles tend to feel more energetic and high-spirited. Physical limitations can impact both physical and mental health, underscoring their overall effect on quality of life, in agreement with Halliday *et al.* (2017), who emphasized the importance of exercise towards a better quality of life.

Vitality is positively associated with physical role, general health, mental health, and emotional role, which suggests that higher energy is linked to better performance of daily activities and perception of health, improved mental well-being, and an enhanced ability to cope with emotional demands. In other words, vitality contributes to better physical and mental health, enhancing participation in social activities and reflecting a general sense of energy, enthusiasm, and interest in life, impacting various aspects of life positively. As Haley *et al.* (2003) noted, high vitality is associated with benefits like increased stress resilience, improved mental health, and reduced risk of chronic diseases. General health is a comprehensive indicator of well-being, influenced by factors like vitality, mental health, emotional role, physical pain, social functioning, and physical and mental health indices. Vitality reflects energy and a positive outlook on life, while good mental health is crucial for psychological well-being, with a reciprocal relationship to general health. Emotional role highlights the ability to handle and express emotions, where good general health boosts confidence and well-being, reducing physical pain. General health also enhances communication, social participation, and relationship building. Consequently, a healthy individual tends to have higher physical and mental health indices, contributing to overall better general health. This interconnectedness shows how general health significantly impacts the quality of life and well-being of parents with children diagnosed with cancer.

Similarly, mental health correlates with general health and various factors like vitality, physical pain, social functioning, and health indices. A parent with good mental health has high energy levels, a sense of well-being, and a positive life outlook, promoting a healthy body and mind, with less physical pain and better social functioning.

Emotional limitations faced by parents dealing with their child's illness are linked to vitality and general and mental health. The correlation between physical pain and several factors (physical functionality, physical role, vitality, general health, mental health, and emotional role) indicates that the pain experienced by parents is a psychosomatic one. Social functioning's association with multiple health indices shows the extensive impact of their child's illness on all life aspects and their ability to interact with their environment (Fayers & Machin, 2013; Hovén *et al.*, 2008).

Childhood or adolescence for cancer patients significantly affects various aspects of their parents' lives. Parents of adolescents reported higher vitality, better general health, higher levels of mental well-being, better emotional well-being, and lower psychological distress compared to parents of younger children. Parental age is also positively associated with mental health outcomes. Parents aged 50-60 years reported higher scores in vitality, general health, and general mental well-being compared to younger parents. This suggests that older age, whether of the child or the parent, helps in better physical and mental coping of both sides with the illness. Older parents have more life experience and greater acceptance of their child's condition, and they have developed stress-coping strategies. Similarly, adolescents with cancer face their condition with more maturity and understanding, leading to fewer awkward questions and better overall handling of the situation. Research by Kim and Given (2008) also supports that

younger age is closely linked to caregiver distress and general psychological discomfort compared to older parents. Also, studies by Klassen *et al.* (2008; 2011) indicate that parental quality of life improves over time. Nevertheless, Bennett *et al.* (2013) noted no improvement in parents' quality of life over time, though this study had a small sample size without exploring longer-term effects.

Single-parent families exhibited higher levels of physical activity and weekly activity scores compared to married parents, probably due to fewer family obligations, allowing them more time for exercise. For single or divorced parents, exercise is a significant part of their health routine and their social interaction, serving as a means of relaxation, stress management and maintenance of good physical and mental health. A single parent might feel solely responsible for his/her child's care and thus prioritizes staying fit and healthy so as to meet the higher demands of sibling illness. This finding is further supported by the weekly exercise participation linked to the presence or absence of parental health problems, with those having health issues exercising more to stay strong for their child's benefit.

Furthermore, parents in good health exhibited higher averages in physical role, general health, emotional role, physical pain, and social functioning variables compared to those reporting moderate health. Healthy parents tend to have balanced physical conditions and participation in daily activities that enhance their physical role, unlike those with moderate health who face more restrictions. Self-perception of general health is also better among physically fit parents since their healthier lifestyles improve the ability to manage stress, pain, and emotional and social demands (Cuthbert *et al.*, 2018). This aligns with findings by, which showed that regular exercise improves general health and both physical and psychological conditions.

The employment status of parents also influences physical activity levels. Parents employed in the public sector exhibited the lowest average of physical functionality due to the often sedentary job demands as well as fixed and inflexible work schedules, negatively impacting their participation in physical activity. In contrast, parents working in the private sector showed the highest physical functionality since they own their businesses with higher incomes, which both provide the flexibility to re-schedule their program accordingly, offer more opportunities for health-promoting activities and provide access to fitness resources and wellness programs. Cho *et al.* (2020) concluded that higher family income reduces the risk of physical inactivity, a finding also supported by Klassen *et al.* (2008). Finally, unemployed parents exhibited physical functionality somewhere in the middle of public and private-sector parent employees. It seems that despite having more free time for physical activities, the psychological stress of unemployment undermines their physical condition.

5. Recommendations

This study is the first of this kind in Greece, and its small sample size highlights the need for future research using larger samples of parents to draw more general conclusions.

The main challenge of this study was sample recruitment due to the low response rate from parents of children with cancer. Parents of children with cancer constitute a unique population for research with time constraints and evident psychological fatigue. Thus, future studies should also address this issue during the initial sample approach to increase parental participation. Exploring the reasons for parental hesitancy to participate in research will contribute to developing more effective recruitment strategies, enhancing data collection methods, and increasing response rates. Comparing the results with parents of healthy children could also be beneficial and provide a more holistic understanding, leading to better insight into the specific challenges and needs of parents of children with cancer. This will allow for a more comprehensive understanding of the conditions and variables influencing the findings in future studies.

6. Conclusion

This study examined the various factors influencing the well-being of parents with children undergoing cancer treatment in Greece. The findings suggest that parents of adolescents and older parents themselves tend to cope better with the situation compared to parents of younger children and younger parents themselves. This highlights the importance of age and maturity in navigating the challenges of childhood cancer.

The study also revealed interesting aspects of family structure and employment status. Single parents, despite facing the burden of sole responsibility, seem to prioritize physical activity for stress management and overall health. Additionally, parents in good health and those working in the private sector displayed higher physical functionality, indicating the positive impact of healthy lifestyles and flexible work schedules.

While this is the first of its kind in Greece, the limitations of sample size and recruitment are acknowledged. Future research should aim for larger samples, develop effective recruitment strategies to address parental hesitancy, and consider comparisons with parents of healthy children. By acknowledging these limitations and pursuing further research along the suggested lines, a more comprehensive understanding of the challenges and needs of parents with children undergoing cancer treatment can be achieved, ultimately leading to better support systems for these families.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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