



## PHYSICAL ACTIVITY, ANXIETY, DEPRESSION AND SMOKING HABITS OF PARENTS HAVING CHILDREN WITH CANCER

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### Abstract:

Parents of children with cancer are a group of people who have been involved in international research, whereas no relative research in Greece has been noticed so far. The purpose of this study was to investigate the effects of children's cancer on their parents of affected children in terms of anxiety and depression levels and adoption of health behaviors including exercise participation and smoking. The study sample consisted of 24 people (14 women and 10 men) aged 38 to 60 years. Research instruments included the use of 3 questionnaires distributed to the participants, that is, the questionnaire of Beacke *et al.* (1982) for the assessment of physical activity, Heatherton *et al.* (1991) test for the assessment of nicotine dependence and Zigmond and Snaith (1983) test for the assessment of anxiety and depression. The statistical analysis was performed using the SPSS 29.0 Statistical Package. The results showed fathers exhibiting higher levels of stress and depression compared to mothers. Additional statistically significant differences were also noted in parental adoption of health behaviors based on different demographic characteristics. Future researches with larger samples are needed to further draw representative conclusions.

**Keywords:** parents, childhood cancer, smoking, exercise, anxiety, depression

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## 1. Introduction

Cancer is a disease that affects many patients and can occur in almost any organ or tissue of the human body when genetic mutations interfere with the normal functioning of a cell. In case gene mutations occur in human body cells due to either hereditary factors or DNA alterations, then healthy cells transform into cancer cells and multiply uncontrollably (Berumen *et al.*, 2018).

Although childhood cancer is considered rare, it is the second leading cause of death in children after accidents. The most common form of childhood cancer is leukaemia, as cancer in children mainly affects their hematopoietic system, whereas worldwide, it is estimated that 400,000 children suffer from some form of cancer each year (Siegel *et al.*, 2023).

## 2. Literature Review

The consequences of childhood cancer are numerous for both children and their parents. A child's cancer diagnosis is a life-altering event for parents, leading to high levels of depression and anxiety due to the responsibility of caring for the child in need and the uncertainty about the future (Aldridge, 2008). Various types of cancer, intense treatments, metastasis, recurrences, and prolonged hospital stays during treatment are associated with high levels of depression and anxiety stemming from the fear of the disease and the loss of control (Hovén *et al.*, 2008).

Consequently, parents of children with cancer face psychological issues, anxiety, and fear regarding their child's illness (Nizamis *et al.*, 2024), and they are more likely to experience health problems and higher smoking rates as a result of caring for their children (Brehaut *et al.*, 2009). A correlation between depression and dependence on smoking is evident (Tsiami *et al.*, 2016). In addition, although physical activity is scientifically documented as the best non-pharmaceutical means of preventing physical and mental health issues (Ziogou, 2013), parents of children with cancer do not adhere to the recommended guidelines for physical activity (Ha *et al.*, 2022). Thus, they exhibit lower exercise levels and higher chances of increased body weight compared to parents of healthy ones (Klassen *et al.*, 2008).

Overall, while the correlation between psychological status, exercise and smoking is well documented, a lack of literature is noticed regarding the profile of parents of children with cancer in the above-mentioned factors. Therefore, the purpose of this study was to investigate the effects of children's cancer on their parents in terms of their level of anxiety and depression, participation in exercise and smoking behavior.

### 3. Material and Methods

#### 3.1 Participants

The sample of the present study consisted of 24 individuals (10 men, 14 women) aged 38 to 60 years. The participants were parents of children with cancer, all members of FLOGA Childhood Cancer Foundation from various regional units in Greece, and their participation was voluntary and anonymous.

#### 3.2 Instruments

Instruments used in this study for research purposes included a) the Baecke *et al.* (1982) questionnaire that evaluates individual physical activity during the last month, including physical activity indexes at work, leisure, sports and a total index of physical activity, b) the questionnaire of Heatherton *et al.* (1991) concerning smoking that assesses the degree of nicotine dependence through 8 questions counting the number of cigarettes and the daily smoking frequency (from very low to very high), c) the depression and anxiety scale questionnaire (Zigmond & Snaith, 1983) consist of 14 questions at a 4 point Likert Scale each item, that measure the severity of emotional disturbance of individuals who may require additional psychological evaluation and support.

Completion of questionnaires took an average of 15 minutes for each participant, including demographic data information related to gender, age, BMI index, education level, occupation, marital status, child's age and health level of respondent parents of children with cancer.

#### 3.3 Procedure

First, an initial telephone communication took place with FLOGA Childhood Cancer Foundation representatives, who initiated contact with members of the association in various regional units. In this way, 24 parents of children with cancer agreed to participate, and they were informed about the research purpose and procedures. Questionnaires were completed either via telephone or through Google Forms completion, with explanations provided by the primary researcher when needed. All participants were ensured that their participation was anonymous and voluntary, whereas the study protocol was approved by the Internal Ethics Committee of DPES, University of Thessaly (protocol number 1-7/7.2.2024).

#### 3.4 Statistical analysis

Analysis of results included the use of the SPSS 29.0 Statistical Package. Analyses included: a) correlation Pearson r analysis of factors b) non-parametric Mann-Whitney U test to locate differences of factors in terms of gender, child age (child, adolescent), parental age, smoking status (yes, no), marital status (single, married) and health problems (yes, no) and c) non-parametric Kruskal-Wallis test to identify differences of variables based on parental education, occupation, health level and body mass index (MBI). A statistically significant level was set at  $p < .05$ .

#### 4. Results and Discussion

Pearson r correlation analysis revealed a positive correlation between depression and anxiety and among physical activity indexes (Table 1).

**Table 1:** Correlation of factors

	1	2	3	4	5	6	7
1. Depression							
2. Anxiety	.684**						
3. Smoking	.231	-.060					
4. Work index	.015	.077	-.196				
5. Leisure index	.287	.162	.383	-.110			
6. Sport index	-.005	-.129	.217	-.088	.451*		
7. Non-sports leisure	.041	-.155	.272	-.251	.670**	.556**	
8. Global	.031	-.068	.052	.627**	.431*	.603**	.529**

Mann-Whitney U analysis revealed statistically significant differences between fathers and mothers of children with cancer in depression (Table 2).

**Table 2:** Mann-Whitney U results of parental gender

Variables	N	Group (Gender)	Mean Rank	Mann-Whitney U	Asymp. Sig.
Depression	10	Male	15.35	41,500	.046
	14	Female	10.46		

Also, Mann-Whitney U analysis revealed statistically significant differences between smoking and non-smoking parents in the sports activity variable (Table 3).

**Table 3:** Mann-Whitney U results of parental smoking

Variables	N	Group (Smoking)	Mean Rank	Mann-Whitney U	Asymp. Sig.
Sport index	15	Yes	10.33	35,000	.025
	9	No	16.11		

The non-parametric Kruskal-Wallis analysis showed statistically significant differences in the body mass index of parents in smoking habits (Table 4).

**Table 4:** Kruskal-Wallis results regarding the body mass index of parents

Variable	Normal weight (N=4)	Overweight (N=5)	Obesity (N=6)	P
Smoking	12,75	4,80	7,50	.024

Moreover, Kruskal-Wallis analysis located statistically significant differences among parents with different body mass index BMI in global index factor (Table 5).

**Table 5:** Kruskal-Wallis results regarding the body mass index of parents

Variable	Normal weight (N=4)	Overweight (N=5)	Obese (N=6)	P
Global Index	11.25	17.31	9.40	.049

Finally, Kruskal-Wallis analysis revealed statistically significant differences in the health of parents in the sports activity factor (Table 6).

**Table 6:** Kruskal-Wallis results regarding the health of parents

Variable	Very good (N=6)	Good (N=15)	Moderate (N=3)	P
Sport index	6,50	15,50	9,50	.021

The purpose of this study was to examine the effect of childhood cancer on parental anxiety, depression and health behaviors such as smoking and level of physical activity. Results showed that there is a positive correlation between parental anxiety and depression that did not seem to correlate with any other factor since the emotional pressure parents experience for their child's health status (Hovén *et al.*, 2008) does not leave them the room and strength to care about something else such as their own health or fitness (Ha *et al.*, 2022). Furthermore, results revealed a positive correlation between leisure time physical activity, physical activity in sports, regular exercise and overall physical activity since these factors are interrelated with each other.

Significant gender differences were observed in depression, with fathers of children with cancer exhibiting higher rates of depression compared to mothers. In Greece, men feel and are considered by many to be the pillars of the family, and consequently, they often internalize their anxiety and worries about serious matters like their children's health, feeling more responsible for providing solutions to important family issues. Moreover, parental counseling in Greece is still at a stage of an early development for families to seek help. In this regard, Vrijmoet-Wiersma *et al.* (2010) study reported mothers experienced more anxiety and depression related to their child's health than fathers, whereas older fathers expressed more anxiety than younger ones.

Hoven *et al.* (2008) and Nizamis *et al.* (2024) studies showed no association between parents' gender and depression. Nevertheless, all parents of children with cancer experience depression and anxiety caused by the type of cancer treatments, overall care they have to offer and general fear for their child's health. On the other hand, Murphy *et al.* (2008) study reported that both mothers and fathers of children with cancer did not exhibit high levels of anxiety and depression, attributed to the years that some of the participant parents were aware of their children's condition, resulting to better mental health (Murphy *et al.*, 2008). Overall, the relation of parents of children with cancer with anxiety and depression appears to differ in research between studies due to different demographic factors.

Parents identifying themselves as smokers, appeared to participate less in sports activities compared to non-smoking parents, suggesting that engaging in physical

activities is associated with healthy behaviors and not with smoking. In other words, regular involvement in physical activity seems to act as a deterrent to start or continue smoking. Engagement in sports leads individuals to adopt habits that promote their well-being and to avoid unhealthy behaviors such as smoking, in agreement with Hassandra, Goudas and Theodorakis (2015) and Boutelle *et al.* (2000) studies favoring higher levels of exercise participation as a mean to reduce smoking as well as anxiety and depression. Although parents who smoke seem to participate less in exercise, the study shows that the majority of smokers maintain a normal body weight. This contrast can be explained by the fact that smoking reduces appetite and, consequently, food consumption. When someone stops smoking, they usually experience stress and embarrassment, which often lead to increased consumption of food for relief. This mechanism results in weight gain and can lead to the development of overweight or obesity (Walker & Loprinzi, 2019).

However, in this sample of parents having children with cancer, anxiety about their child's illness seems to take precedence over less important issues in parental life, such as their everyday diet. In this study, overweight parents exhibited higher rates of physical activity participation compared to normal-weight and obese parents. This finding suggests that overweight parents of children with cancer are actively trying to reduce and regulate their body weight by showing greater dedication and effort to exercise. Through this effort, they have the opportunity to improve their overall health and fitness, making them feel stronger and more resilient to face the challenges of their child's condition. On the contrary, people with normal weight probably feel confident about their health and perceive that they do not need to exercise regularly. Obese parents, on the other hand, may have been discouraged from trying to reduce weight to promote their physical health through exercise. Thus, they decided to focus primarily on the care and health of their child, leaving their own physical condition behind. Quite clearly, obese parents of children with cancer are more likely to do insufficient physical activity (Halliday *et al.*, 2017).

Finally, parents who reported being in very good health seem to participate less frequently in sports activities compared to those reporting good or moderate health status. This shows that they consider their health good enough to further engage in sports and physical activity.

## 5. Recommendations

The present survey was carried out for the first time in Greece; therefore, it is limited by its exploratory nature and small sample size. The inadequate response from parents of children with cancer to participate in this study was also an issue highlighting their evident psychological fatigue that needs to be addressed by future research. Thus, findings suggest that more research efforts with larger samples are needed to further draw useful conclusions and gather representative data.

## 6. Conclusion

This study investigated various factors influencing the well-being of parents with children undergoing cancer treatment in Greece. The findings highlight the complexity of parental mental and physical health in this situation. A key issue is the potential difference in how mothers and fathers experience depression. Greek societal expectations may contribute to higher depression rates in fathers, while international studies suggest mothers often bear the burden of anxiety and depression. Further research is needed to explore these cultural nuances.

The study also revealed a potential link between physical activity and mental health. Parents who reported smoking participated less in sports, suggesting a connection between healthy behaviors. Interestingly, overweight parents exercised more than normal-weight parents, possibly indicating a conscious effort to manage their health. Conversely, obese parents may be discouraged by weight management challenges and prioritize their child's care over their own physical activity.

The positive impact of physical activity on mental health was further supported by the finding that those who perceived themselves as "in very good health" exercised less frequently than those in "good" or "moderate" health. This suggests a potential link between exercise as a means to improve health rather than simply maintain it. A significant limitation of this study is the small sample size due to low response rates. Parents of children with cancer face immense challenges, and their time and emotional state may limit their participation in research. Future studies should address this by employing larger samples and developing more effective recruitment strategies that are sensitive to the specific needs of this population.

Overall, this study provides valuable insights into the diverse factors influencing the well-being of parents with children undergoing cancer treatment in Greece. By acknowledging the limitations and pursuing further research along the suggested lines, a more comprehensive understanding of these challenges 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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