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Psychological functioning of adolescent with cancer

Lina Pezzuti^a, Brigitte Dell'Anna^b, Stefania Quarato^c, Paolo Colavero^d, Assunta Tornesello^d, James Dawe^a, Silvia Varani^e

^a*Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome, Rome, Italy*

^b*Clinical Psychologist, specialized in Psycho-oncology and in Psychotherapy*

^c*Clinical Psychologist and specialist in Psychotherapy*

^d*Pediatric Oncology Unit, Vito Fazzi Hospital, Lecce, Italy*

^e*Training and Research Unit, National Tumor Assistance (ANT), Bologna, Italy*

Abstract

Oncological diseases in adolescence are stressful for psychological health since it represents a critical period of development marked by the structuring of identity, relationships, autonomy, and personality. The implementation of adaptive or maladaptive responses, i.e. different coping strategies, is influenced by multiple factors, including temperament and personality characteristics. The aim of the present research was to compare the scores obtained at the Personality Assessment Inventory - Adolescent (PAI-A) by two groups of 87 adolescents aged between 12 and 18 years, oncological and not, perfectly matched for age and gender, with the aim of investigating the differences regarding specific aspects of personality, relational modes, and psychopathological manifestations or symptoms. The results of the analysis of the scales and subscales of the PAI-A show the higher mean scores in the group of adolescents with cancer for the followed scales and subscales: Somatic Complaints; Conversion; Somatization; Health Concerns; Depression; Physiological Depression; Persecution; Resentment; Schizophrenia; Social Detachment; Alcohol and Drug Problems; Suicidal Ideation; Affective Instability; Antisocial Features and Behaviors; Egocentricity; Physical Aggression; and Stress and Nonsupport. Conversely, the control group showed higher mean scores on dimensions such as Warmth, Irritability, Hypervigilance, and Dominance. The largest difference with the control group concerns the scales of alcohol and drug use. The results are discussed in light of the current literature.

Keywords: adolescent; cancer; oncology; personality; Personality Assessment Inventory-Adolescent.

*Corresponding author.

Lina Pezzuti
Department of Dynamic and Clinical
Psychology, and Health Studies
Sapienza University of Rome
Via degli Apuli, 1, 00185, Rome, Italy
Phone: + 39 0649917939
E-mail: lina.pezzuti@uniroma1.it
(L. Pezzuti)

Introduction

Receiving a cancer diagnosis is shocking for any individual, especially an adolescent, who is suddenly faced with a world of pain and profound devastation, while at the same time going through the essential stages of personal growth (Sourkes, 1999). The interruption of school or work, economic instability, the difficulty of developing and maintenance of crucial relationships, as well as the impact of the illness on physical characteristics, sexuality, and the side effects on fertility, expose adolescents to a high risk of emotional problems. They have to cope with an illness that produces dependency, that makes them different from their peers, that opens the door to a premature confrontation with mortality, that creates insecurity, loss of planning, physical integrity, family and social roles, and finally provokes the fear of stigmatization (Marcelli & Braconnier, 1999).

Cancer illnesses in adolescence pose a challenge to mental health in a critical period of development characterized by the structuring of identity, relationships, autonomy, and personality. The implementation of adaptive or maladaptive responses, i.e. different coping strategies, is influenced by many factors, including temperament and personality characteristics. These dimensions have been shown to be important in individual differences and in the psychological functioning of adolescents with cancer, so the study of these aspects is essential. For example, patients with hyper-vigilant, controlling, and obsessive personality traits may not accept the inability to manage themselves and their bodies, or they may complain about the lack of precise answers to all their questions. In fact, seeking information about their illness may be interpreted as a need to take control over this reality, which is so upsetting to them (Gambarota et al., 2016). On the other hand, patients with dependent traits may need constant support, to a greater extent than normal, clinging to family members or medical staff and causing a negative or angry reaction that would result in a sense of loneliness and extreme incapacity (Wise et al., 2013).

A study by Greenberg et al. (1989) of childhood cancer survivors aged 8 to 16 and healthy children showed the survivors had a poorer overall self-concept in the areas of academic achievement, behavior, happiness, and anxiety than healthy peers. A more frequently external locus of control was also found, although within normative limits. In agreement with this, the study by Servitzoglou et al. (2008) shows that cancer survivors have reduced self-esteem and that the anxiety of young patients is not eliminated by the end of treatment.

In a more recent study, Howard Sharp and colleagues (2015) examined psychological functioning in patients aged 8-17 years and a control sample of peers, looking in particular at the role of dispositional factors. Some subjects were not receiving any treatment, others continued to receive treatment and others were in remission. With regard to specific dispositional variables, optimism predicted fewer symptoms of depression, anxiety, and post-traumatic stress disorder (PTSD), whereas neuroticism predicted more symptoms. Extraversion was inversely associated with depression and anxiety but not PTSD; whereas openness and conscientiousness were significantly related to a lower depression score but not to anxiety or PTSD. Consistent with the adult oncology literature (Dunn et al., 2011), optimism and extroversion,

in contrast to neuroticism, predispose to better psychological functioning. Again, a study by Chen and colleagues (2020) investigated the correlation between personality characteristics and profiles of distress, anxiety, or emotional growth in a sample of adolescents and young adults aged 14-39 years with a cancer diagnosis. Participants with high distress profiles scored higher on Neuroticism than participants with profiles with less distress. Individuals with a high score on Neuroticism may be more sensitive to the threat caused by cancer and use less adaptive coping strategies (You et al., 2018), which could increase emotional distress.

In a study by Kosir and colleagues (2020), the adolescents with cancer and the survivors considered the disease, and the related events, to be the most stressful events in their lives, with 62% stating the centrality of this event to the formation of their identity and sense of self. This result suggests that cancer may have a long-term effect on their lives, leading to poorer psychological functioning and quality of life. In addition, the study investigated the association between cancer-related worry, rumination, and anxiety levels in adolescents with cancer and the survivors.

Despite the limited number of studies on the personality dimension in cancer adolescents, this knowledge is a valuable aid in identifying adolescents who could benefit from psychological intervention to prevent or reduce the distress experienced. The decision, in this paper, to focus the attention on a sample of adolescents with cancer is mainly motivated by the presence in the literature, as well as in reality, of less attention and awareness regarding the specific characteristics, needs, and peculiar requirements of this target population. Often, the pathway from diagnosis to treatment is crossed by the adolescent as if he were in a "no man's land": hovering between the world of pediatric oncology and the adult one (Ferrari et al., 2010). Moreover, the world of the adolescent is in itself a tumultuous phase of life, vulnerable to the many challenges he or she faces. The choice of this particular sample is also motivated by the need to explore how the adolescent, who is already going through a complex phase of life, may be able to intertwine his or her dreams with another impetuous reality, such as a cancer diagnosis.

The main aim of the present work is, therefore, the study of personality aspects in a sample of adolescents with cancer comparing them with a control group matched for gender and age. Since there cannot be a typical personality of the oncological adolescent, with the present research the aim is to verify the differences in terms of the manifestation of symptoms of distress, highlighting which individual and relational modalities can be implemented more frequently in facing the disease by the group of adolescents with cancer.

Method

Participants

For the recruitment of adolescents with oncological diseases, the present research has been carried out in collaboration with the 'Vito Fazzi' Hospital in Lecce (Italy) and National Tumor Assistance (ANT) in Bologna (Italy). The home care model

managed by the ANT Foundation employs a hospital-at-home approach in which a multidisciplinary team of physicians, nurses, and psychologists, all trained in palliative care, work around-the-clock, 24 h/7 days a week to assist cancer patients. The service is free for the patients and it is offered in agreement with the National Health Service.

The total sample consisted of 87 adolescents (49 females and 38 males) aged between 12 and 18 years (mean age = 15.86, $ds = 1.48$) diagnosed with cancer. Forty-eight percent of the subjects had cancer defined by their physicians as liquid and 52% as solid. More specifically, 43% had a diagnosis of acute lymphoblastic leukemia, 17% suffering from neuroblastoma, 10% from rhabdomyosarcoma, 7% from Hodgkin's lymphoma, and the remaining 23% from other types such as Wilms' cancer, cerebral cavernoma, Langerhans cell histiocyte, and ovarian dysgerminoma. Seventy subjects (80%) were in therapy and 17 (20%) in control/healing phase. 52% of patients were undergoing chemotherapy, 13% undergoing surgery, and the remainder undergoing immunosuppressive therapies, transplants, etc. 85% of patients had a positive prognosis and 15% an unfavorable one. 60% of the subjects come from a medium social background, 15% from a low social background and 25% from a high social background. More specifically, 55% had both parents with at least a high school and/or a university degree and 45% had parents with a lower level of education. 31% of the participants are from central Italy, 35% from the north, and 35% from the south of Italy.

This sample was complemented by a control sample ($n=87$; 49 females and 38 males aged between 12 and 18 years) perfectly matched for gender and age and education level of parents. The control sample was recruited through the collaboration of one secondary school in Taranto and one high school in Rome (Italy).

Three trained psychologists collected data in both clinical and schools settings in the period between 2019 and 2021. All subjects participating in the research received an informed parental consent model which was reviewed and signed by their parents. Furthermore, participants were guaranteed complete anonymity.

The research is compliant to the Ethics Committee of the Department of Dynamic, Clinical and Health Psychology of the Sapienza University of Rome (certified in April 11, 2018).

Instruments

The participants were administered the Italian version of the *Personality Assessment Inventory - Adolescent* (Morey, 2007; Pezzuti et al., 2021). The PAI-A is a self-report instrument of personality by L.C. Morey (2007) for the clinical assessment of adolescents aged between 12 and 18 years. The PAI-A was designed by examining the clinical constructs both in terms of their relevance within the nosology of mental disorders and their significance in contemporary diagnostic practice. Each psychopathological aspect can be examined at a macro level (through domains and scales) and at a deep level of detail (through subscales). Moreover, the four-point Likert scale ("not at all true", "not very true", "almost true", "absolutely

true") allows the subject examined to better define his or her experience and enables the clinician to measure the depth of a trait or the severity of a condition rather than just its presence or absence. The PAI-A consists of 264 items, which make up 22 scales: 4 Validity Scales (Inconsistency, Infrequency, Negative Impression, Positive Impression), 11 Clinical Scales (Somatic Complaints, Anxiety, Anxiety-Related Disorders, Depression, Mania, Paranoia, Schizophrenia, Borderline Features, Antisocial Features, Alcohol Problems, Drug Problems), 5 Treatment Scales (Aggression, Suicidal Ideation, Stress, Nonsupport, Treatment Rejection), 2 Interpersonal Scales (Dominance and Warmth). Each of the 11 clinical scales and the Aggression scale has subscales (see Table 1). PAI-A scoring provides for T points with a mean of 50 and a standard deviation of 10. In the Italian standardization of the PAI-A, the reliability was studied by means of the alpha coefficients of internal consistency (Cronbach's Alpha) both for the Italian non-clinical standardization sample ($N = 1680$) and for the clinical sample ($N = 352$). The results for the thematic scales show reasonable internal consistency, with mean alpha coefficients for the thematic scales of .72 for the non-clinical standardization sample and .79 for the clinical sample. The results for the subscales of the PAI-A showed average alphas of .61 for the non-clinical standardization sample and .70 for the clinical sample. Overall, the values are acceptable and in line with those of the US edition, although a few points lower. To determine the stability of the PAI-A scales over time, the test was administered on two separate occasions to a sample of 60 non-clinical Italian adolescents. Although the stability of the scales in a clinical population is also of interest, it would be difficult to interpret changes in this population due to treatment effects and changes associated with the course of a disorder. Because the PAI-A was designed to be sensitive to changes associated with treatment, it was preferred to test scale stability in a non-clinical, untreated sample. The non-clinical sample of 60 adolescents ranged in age from 14 to 18 years ($M = 16.32$ years; $SD = 1.17$); 73% were female. The retest interval for participants ranged from 11 to 41 days ($M = 27.63$ days; $SD = 8.75$). Test-retest correlations for the thematic scales and subscales of the PAI-A are given in the Italian standardization Manual. The test-retest reliability coefficients of the scales and subscales of the PAI-A are respectively .72 and .69. The mean T-scores for the entire test-retest sample at the two administration times are very similar, indicating that there has been little change in the PAI-A scales and subscales over time. Convergent and discriminant validity studies were carried out on the US edition of the PAI-A using various samples of clinical and non-clinical subjects. Along with the PAI-A, subjects were tested with various combinations of diagnostic instruments such as the *Beck Depression Inventory* [BDI; Beck & Steer, 1987], the *Minnesota Multiphasic Personality Inventory-Adolescent* [MMPI-A; Butcher et al, 1992], the *Adolescent Psychopathology Scales* (APS; Reynolds, 1998), the *Personality Inventory for Youth* (PIY; Lachar & Gruber, 1995), the *NEO Five Factor Inventory* (NEO-FFI; Costa & McCrae, 1989), the *Symptom Assessment-45* (SA-45; Davison et al., 1997), the *Clinical Assessment of Depression* (CAD; Bracken & Howell, 2004), and other measures.

Data analysis

In order to study any differences in the scores on the scales and subscales of the PAI-A between the oncology group and the matched control group, MANOVAs were performed and the univariate effects on the dependent variables were analyzed. The effect-size (η^2) will be interpreted according to the following cut-offs: if $\eta^2 \geq .01$ a low effect emerges, if $\eta^2 \geq .06$ there is a moderate effect, and if $\eta^2 \geq .14$ the effect is high.

Result

In order to compare the group of oncological adolescents with the control group of adolescents matched for age and gender, the mean scores for each scale and subscale of the PAI-A were studied. The data in Table 1 also present the magnitude of the effect (η^2) that health status has on the dimensions assessed by the PAI-A.

Analyzing the validity scales of the PAI-A, the adolescents with cancer show a statistically significant difference from the adolescents of the control group in all four scales, with a large effect ($\eta^2 \geq .14$) on three scales. In particular, the former shows some inconsistency in responses to similar items (Inconsistency), and some idiosyncratic responses (Infrequency). Furthermore, compared to the control group, they tend to present self-reported data that reflect a greater level of psychopathology than is objectively present (Negative Impression).

The results of the analysis of the scales and subscales of the PAI-A (see Table 1) show: a high effect (see η^2) with higher mean scores in the group of adolescents with cancer for the

clinical scale Somatic Complaints and its subscales Conversion, Somatization and Health Concerns. High scores also emerge in the subscale Persecution, in the scale Schizophrenia and its subscale Social Detachment, in the scales Alcohol and Drug Problems and Suicidal Ideation. In contrast, a high effect emerges with higher mean scores by the control group in the interpersonal subscale Warmth.

A moderate effect ($\eta^2 > .06$ and $< .14$) emerges for the dimensions Depression and its subscale Physiological Depression, Resentment, Affective Instability, Antisocial Features and Behaviors, Egocentricity, Physical Aggression, and for Stress and Nonsupport scales, in which the oncological group scored significantly higher than the control group. Conversely, the control group showed higher mean scores on Irritability, Hypervigilance, and Dominance dimensions.

The PAI-A provides a skyline that demarcates two standard deviations above the mean of a representative clinical sample against which the assessed subjects can be compared. Comparing the average scores obtained by the clinical and non-clinical sample of the present research on the scales and subscales of the PAI-A with the skyline scores of the Italian standardization sample, it emerges that while in the non-clinical sample no critical points were found on any of the scales and subscales, in the clinical sample it emerges that the average score of the Alcohol Problems scale (74.03) exceeds the Italian skyline of 74. More specifically, 53% of cancer adolescents show signs of alcohol abuse (versus 0.05% of the adolescents in the control sample). Analyzing also the Drug Problems scale 52% of cancer adolescents in the clinical sample seems to have experienced drug-related problems (versus .08% of the adolescents in the control sample). A particular criticality for these two dimensions in the sample of adolescents with cancer became apparent from these results.

Tab. 1. Comparison between the group of adolescents with cancer (n=87) and the control group of adolescents (n=87) on the scales and subscales of the PAI-A

PAI-A Scales and Subscales	Group of adolescents with cancer (n=87)	Control group of adolescents (n=87)	F	P	η^2
	mean (sd)	mean (sd)			
Validity Scales					
Inconsistency	72.79 (17.89)	53.09 (11.33)	75.30	<.001	.30
Infrequency	70.90 (19.77)	50.44 (11.45)	69.82	<.001	.29
Negative Impression	65.11 (11.95)	51.61 (11.97)	55.49	<.001	.24
Positive Impression	53.40 (9.06)	48.36 (9.65)	12.71	<.001	.07
Clinical Scales and Subscales					
Somatic Complaints	68.56 (10.68)	52.55 (11.41)	91.33	<.001	.35
Conversion	60.08 (9.79)	52.08 (10.00)	28.44	<.001	.14
Somatization	63.53 (11.20)	51.95 (10.77)	48.31	<.001	.22
Health Concerns	71.82 (13.19)	51.87 (10.96)	117.68	<.001	.41
Anxiety	54.31 (7.45)	52.09 (10.43)	2.61	.108	.02
Cognitive	53.24 (8.33)	52.03 (9.80)	.77	.382	.00
Affective	52.76 (8.51)	50.93 (11.18)	1.47	.227	.01
Physiological	54.97 (8.96)	52.53 (9.87)	2.91	.090	.02
Anxiety-Related Disorders	54.22 (7.34)	52.31 (9.38)	2.23	.137	.01
Obsessive-Compulsive	51.10 (7.81)	52.43 (8.88)	1.09	.299	.01
Phobias	52.38 (9.25)	49.09 (9.15)	5.55	.020	.03

PAI-A Scales and Subscales	Group of adolescents with cancer (n=87)	Control group of adolescents (n=87)	F	P	η^2
	mean (sd)	mean (sd)			
Traumatic Stress	54.79 (6.73)	52.89 (10.21)	2.12	.147	.01
Depression	58.39 (9.97)	51.94 (10.55)	17.17	<.001	.09
Cognitive	54.84 (9.74)	50.36 (9.41)	9.53	.002	.05
Affective	58.14 (10.11)	53.45 (10.43)	9.07	.003	.05
Physiological	58.73 (10.98)	51.83 (11.06)	17.04	<.001	.09
Mania	53.51 (10.53)	55.29 (11.79)	1.10	.295	.01
Active Level	56.38 (10.78)	53.37 (11.53)	3.17	.077	.02
Grandiosity	52.63 (9.75)	51.61 (11.01)	.42	.516	.00
Irritability	48.43 (9.50)	54.05 (10.60)	13.56	<.001	.07
Paranoia	55.49 (8.80)	51.91 (9.77)	6.47	.012	.04
Hypervigilance	47.41 (8.46)	53.25 (9.70)	17.90	<.001	.09
Persecution	58.65 (10.59)	50.31 (9.08)	31.10	<.001	.15
Resentment	56.09 (9.06)	50.74 (10.18)	13.41	<.001	.07
Schizophrenia	59.85 (10.26)	50.83 (9.86)	34.98	<.001	.17
Psychotic Experience	56.25 (10.11)	51.89 (10.14)	8.18	.005	.05
Social Detachment	60.71 (12.28)	49.19 (9.76)	46.85	<.001	.21
Thought Disorder	55.66 (9.59)	51.03 (10.41)	9.28	.003	.05
Borderline Features	54.54 (7.56)	52.70 (9.97)	1.88	.172	.01
Affective Instability	56.37 (8.69)	51.04 (11.07)	12.46	<.001	.07
Identity Problems	50.24 (8.57)	51.86 (10.47)	1.25	.265	.01
Negative Relationships	51.47 (8.00)	53.20 (8.73)	1.85	.176	.01
Self-Harm	56.46 (10.86)	52.11 (9.70)	7.75	.006	.04
Antisocial Features	58.21 (11.56)	51.95 (9.71)	14.97	<.001	.08
Antisocial Behaviors	57.28 (11.28)	52.18 (9.86)	10.09	.002	.06
Egocentricity	59.91 (12.56)	50.76 (11.22)	25.69	<.001	.13
Stimulus-Seeking	52.25 (10.89)	51.11 (9.81)	.53	.468	.00
Alcohol Problems	74.03 (20.61)	52.72 (12.22)	68.81	<.001	.29
Drug Problems	73.94 (21.28)	52.35 (13.68)	63.39	<.001	.27
Treatment Scales and Subscales					
Aggression	55.77 (7.66)	52.63 (10.85)	4.86	.029	.03
Aggressive Attitude	56.21 (7.55)	52.02 (10.81)	8.79	.003	.05
Verbal Aggression	49.32 (8.60)	52.48 (8.96)	5.64	.019	.03
Physical Aggression	58.20 (10.78)	51.68 (11.90)	14.33	<.001	.08
Suicidal Ideation	63.43 (12.19)	52.78 (14.12)	28.34	<.001	.14
Stress	58.12 (10.23)	52.05 (10.36)	15.14	<.001	.08
Nonsupport	56.81 (9.13)	50.99 (8.96)	17.96	<.001	.10
Treatment Rejection	47.31 (7.01)	46.48 (10.30)	.38	.536	.00
Interpersonal Scales					
Dominance	45.45 (8.43)	51.33 (10.72)	16.19	<.001	.09
Warmth	40.78 (11.90)	52.03 (8.35)	52.07	<.001	.23

Note. For interpretation of effect size (η^2): small effect if $\eta^2 = .01$; moderate effect if $\eta^2 = .06$; and large effect if $\eta^2 = .14$.

Discussion and conclusion

Oncological diseases in adolescence are stressful for psychological health since it represents a critical period of development marked by the structuring of identity, relationships, autonomy, and personality. The implementation of adaptive or maladaptive responses, i.e. different coping strategies, is influenced by multiple factors, including temperament and personality characteristics. These dimensions have been shown to be important in individual differences and in the psychological functioning of adolescents diagnosed with cancer. A more mature personality can cope even with great difficulties, having the possibility to use different defensive mechanisms. Whereas a more pathological or simply immature personality will have more rigid and limited modes of response that may not be advantageous and suitable for the specific situation. Research using a five-factor model of personality (neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness) has shown that they significantly predict adolescents' adjustment to cancer and psychological functioning. In particular, the dimensions of optimism and extroversion predict better psychological functioning (Zenger et al., 2010; Carver et al., 2010; Dunn et al., 2011) whereas neuroticism predicts worse functioning in these patients (Malouff et al., 2005). In contrast to the adult literature, agreeableness does not significantly predict measures of psychological functioning (Carver et al., 2010). The dimensions of agreeableness and conscientiousness may be related to other adjustment problems such as externalizing difficulties (Miller et al., 2008). Analysis of dispositional factors suggests that relatively stable aspects of personality are related to psychological well-being with respect to the experience of cancer diagnosis and treatment (Phipps et al., 2009).

Other studies show how adolescents with hyper-vigilant, controlling, and obsessive personality traits may not accept that they no longer have complete control over themselves and their bodies, or may particularly suffer from the lack of precise and clear answers to their questions (Wise et al., 2013). In fact, the need to seek information about one's illness could be a way to take control over such a distressing reality (Gambarota et al., 2016). Patients with dependent traits, on the other hand, might need constant support causing a negative or angry reaction in family members or medical and nursing staff and experiencing a greater sense of loneliness and incapacity (Wise et al., 2013). For example, the resulting relationship of dependence with the mother may be characterized by an aggressive-anxious ambivalence (Guarino, 2006). Furthermore, the adolescent with cancer grows and becomes mature more quickly than his or her peers, with some authors demonstrating an increase in confidence and personal awareness. They define positive aspects present in cancer adolescents such as optimism, personal strength, empathy, and positive interaction with peers and also negative aspects such as physical damage, psychological impact, and loss of time (Castellano-Tejedor et al., 2015).

The present research contributes more to a broader exploration of the personality aspects that characterize adolescents affected by neoplasia, highlighting some

particularly interesting aspects of the psychological functioning of these subjects. Using the Personality Assessment Inventory - Adolescent (PAI-A), it was possible to draw a profile characterized by macro information on the presence of psychopathological characteristics (thanks to the domains and scales), but also, above all, at a much more detailed level (thanks to the sub-dimensions or subscales).

The aim of the present research was to compare the scores obtained on the scales and subscales of the PAI-A of two groups of adolescents, oncological and not, perfectly matched for age and gender, with the aim of investigating the differences regarding specific aspects of personality, relational modes, and psychopathological manifestations or symptoms. The analyses carried out revealed how the disease condition has a significant effect, sometimes moderate, sometimes high, on some scales and subscales of the PAI-A. In detail, oncological subjects obtain higher scores on the negative impression, i.e. they present an excessively unfavorable image, reporting significant symptoms that in this case do not denote a simulation but rather a real condition of discomfort and significant physical and psychological suffering, and on incoherence, for which oncological subjects probably show neglect or difficulty in concentrating and reading while filling in the questionnaire.

Furthermore, according to the clinical scales, cancer adolescents seem to have higher somatic complaints, in particular, they are more concerned about their health status than the control group, they frequently manifest common somatic symptoms and symptoms associated with conversion disorder, especially sensory and motor dysfunctions.

Another frequently studied aspect is depression, even if some studies show a high level of depression in sick adolescents compared to the healthy population (Canning et al., 1992), while others conclude that depressive symptoms decrease significantly in the first six months (Magal-Vardi, Laor et al., 2004). In the present research, cancer patients show increased levels of depression, specifically physiological depression, whereby they experience difficulty in falling asleep or eating and are excessively sad, silent or withdrawn. The results also show a reduced level of irritability, dominance, and hypervigilance compared to the control group. These behaviors reflect the shock and distress caused by the cancer diagnosis. In addition, the health condition has a statistically significant effect on persecution and resentment in cancer subjects. As it is well documented, according to Piaget's theory (Bibace & Walsh, 1980) the concept of disease evolves with the development of the concept of causality, so that during the formal stage children are able to understand the causes, both physical and psychological, and the effects that the disease can determine. However, this theory of staging should not be considered absolute and true in all circumstances since cancer adolescents often experience periods of regression where the representation of the disease may be distorted by the emotional condition in which they find themselves (Guarino, 2006), considering the disease as an external aggressive event. All of this could explain the high scores of persecutory symptoms (considering the items such as: "I am the target of a conspiracy", "people have it in for me", "there are people who want to hurt me") or the resentment, which lead cancer adolescents to blame others for

their misfortunes, rejecting what comes from the adult world with the only result of closing themselves in a tragic isolation.

In fact, these considerations reflect the condition of social withdrawal highlighted by the oncological sample compared to the control group. The disease condition determines a loss of identity and integrity and an impairment of social relations, feeding feelings of loneliness, isolation, and social withdrawal (Axia, 2015). It represents a condition of diversity that greatly reduces the exchange with others and relationships with peers, which are fundamental in adolescence. Adolescents experience feelings of exclusion that can lead to an attitude of deep isolation; moreover, the shame caused by the physical condition and the reduced self-esteem due to a disfigured body can deter the adolescent from embarking on a romantic relationship or interrupting the one in progress (Carta & Montisci, 2002). In order to cope with the stress of the disease, adolescents prefer to turn to the emotional support offered by friends and relatives, but the experience of cancer can cause a break in routine, causing these young adults to sometimes be forced to abandon or diminish their relationships with their peers (Chester & Barbarin, 1987); This seems perfectly in line with the reduced relational warmth that emerged from the results, which configures oncological adolescents as less sociable, affectionate or cordial in interpersonal relations and could also explain the high score of egocentrism found, as a tendency not to want to enter into relationships or bond with a person. In fact, the oncological adolescents in this study perceived a moderate lack of social support and backing compared to the control group and also an affective instability, that is, rapid and sudden changes in mood, showing that they were sometimes aggressive and sometimes shy and desperate. In particular, as far as physical aggressiveness is concerned, in the present study cancer adolescents reported lower scores than the control group, probably due to the side effects that interfere with the development of externalizing behavior, limiting the ability to assume physically aggressive behaviors (Verrill et al., 2000).

Finally, oncological subjects were found to be more stressed because of what the disease condition entails, such as long hospital stays, treatments, surgery, physical pain, suffering, separation from family, and instability. In the present study they also appear more inclined to take alcohol or drugs such as medication (as one might hypothesize considering the item "I have taken drugs prescribed by the doctor to get high") to try to ward off or reduce physical and psychological suffering, a result in contrast to other studies in which no such risk behavior emerged (Verrill et al., 2000).

A further finding of the present study concerns the higher suicidal ideation found in the oncological sample. The issue of suicide is very complex, ranging from ideation that anyone can experience to brutal suicide, albeit rare (Guarino, 2006), also considering parasuicidal behavior such as abandoning treatment (Ravazi & Delvaux, 2002).

In the light of the relational framework that emerged in this specific research sample, in a perspective of integrated care of adolescent patients, through preventive interventions, it is necessary to deal not only with the illness but also with the psychological life of patients, supporting the continuity of relationships. The results of this research raise questions about what actions can be taken by those involved in their

care (including friends, family, and health and psychosocial workers). For example, a program highlighted by Olsen and Harder (2009) focusing on communication facilitation, support, and social network education for cancer adolescents would help to initiate and maintain relationships with peers, not only to provide these individuals with support, but also to foster normative development and continuity with everyday life. Having teams with multidisciplinary expertise in the field of mental health is a major challenge in order for support to be effective and valuable in containing vulnerability and increasing resilience of patients to illness. In this regard, a study reports positive results in terms of resilience, life expectancy, quality of life, and decreased distress in a sample of 92 adolescents who received an intervention to promote resilience in managing stress during illness (Wolf et al., 2020).

Overall, these findings could provide a starting point for clinical and non-clinical care of adolescents facing cancer, while recognizing their particular developmental context; the need, therefore, to consider them first as adolescents and then as cancer patients.

Author Contributions

The authors discussed the contents of this article together. Lina Pezzuti conceptualized the study elaborated on the research design and hypotheses, and contributed to the interpretation of research findings. Brigitte Dell'Anna and Stefania Quarato collected data and contributed to writing and editing of this paper and collected the references and carried out management activities to scrub and maintain research data. Lina Pezzuti and James Dawe devised the methodological content, analyzed the data, and contributed to the interpretation of research findings. Assunta Tornesello and Paolo Colavero made it possible to collect data in 'Vito Fazzi' Hospital in Lecce (Italy). Silvia Variani made it possible to collect data in Training and Research Unit of National Tumor Assistance in Bologna (Italy). All authors wrote the final version of this paper.

Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no competing interests.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research has been approved by the ethical committee of the Department of Dynamic and Clinical Psychology, and Health Studies of the Faculty of Medicine and Psychology of the Sapienza University of Rome.

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