Peer-reviewed version available at *Children* **2020**, *7*, 40; doi:10.3390/children7050040

Article

Health Locus of Control in Parents of Children with Leukemia and Associations with Their Life Perceptions and Depression Symptomatology

Marta Tremolada [1,2]*°, Livia Taverna [3]°, Sabrina Bonichini [1], Maria Caterina Putti [2], Marta Pillon[2], Alessandra Biffi [2]

[1] Department of Development and Social Psychology, University of Padua, Italy; marta.tremolada@unipd.it; s.bonichini@unipd.it
[2] Pediatric Hematology, Oncology and Stem Cell Transplant Center, Department of Women and Child's Health, University of Padua, Italy; mariacaterina.putti@unipd.it; alessandra.biffi@unipd.it
[3] Faculty of Education, Free University of Bolzano-Bozen, Brixen, Italy; livia.taverna@unibz.it
* Correspondence: marta.tremolada@unipd.it; Tel.: +39-34-7486-8835

° the authors contributed equally to this work

Abstract: Health locus of control is the set of beliefs a person has about his or her personal influence on health. The current study aimed at identifying types of locus of control in parents of leukemia children and possible association with depressive symptomatology and current life perception. 104 parents were recruited at the Haematology-Oncologic Clinic of Padua post 1 month from the leukemia diagnosis. Participants were Caucasian with a mean age of 37.28 years (SD=5.89), mostly mothers (87.5%) and with a mean of 12.16 years of education (SD=3.82). After signing the informed consent, they filled in the Ladder of Life questionnaire, the BSI-18 and the Parents Health Locus Of Control (PHLOC). Paired-samples t-test (t= -14.42; df=103; p=0.0001) showed that parents of leukemia children were more inclined to have an external locus of control than an internal one. Hierarchical regression analysis model (R2=0.34; F=4.32; p=0.0001) identified health professional influence (ß= -0.28; p=0.004), current life perception (ß= -0.3; p=0.013) and future life perception (ß= -0.26; p=0.012) as significantly predictors on Parental depression. Improving trust in the medical staff care and parental life perceptions could be a preventive program to cope with parental depression symptomatology.

Keywords: children with leukemia; parents; health locus of control; depression; life perceptions

1. Introduction

Health locus of control is defined as the set of beliefs a person has about his or her personal influence on health. This set of beliefs includes: Internal locus of control (if the individual believes that personal actions or thoughts can affect their outcomes) and external locus of control (if the outcome is believed to be determined by powerful others such as God, health professionals, or if chance is believed to control the outcome) [1, 2]. Empirical research suggests that health locus of control may play a significant role in determining people's health-related behaviors [3] and can explain some of the variability in health-seeking behaviors or attitudes [4]. Parents have an important role in the promotion of their children's health especially when their children are very young. Parenting was considered a key factor to help children in their coping with the illness [5] and for this reason it is fundamental to identify the stable factors that could help parents to have a good life

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perception and to avoid depression symptoms. It is therefore of interest to assess parental locus of control relative to their children's health [6].

Attribution research has examined parental locus of control (PLOC) as an important component of parental cognitions and beliefs [7]. Parental locus of control is parental perceptions of their power and efficacy in the parent–child relationship [8]. Although parental locus of control has been often conceptualized as being either internal or external (e.g., [9]), some researchers have suggested that it is a continuous construct (particularly as it relates to motivation) and ranges from internal at one end to external at the other [10]. Parents with a more internal PLOC attribute their child's behavior to internal factors, such as their own parenting techniques and strategies, whereas parents with a more external PLOC attribute their child's behavior to external factors, such as chance or the negative influence of peers, rather than their own parenting behaviors [9].

Parents who reported a strong belief in the influence of powerful others had children who were more successful throughout treatment. In contrast, those parents who reported that their child's outcome was due to chance had children with worse treatment outcomes. Regarding adherence, parents with strong beliefs in chance and those who felt they were more responsible for the child's weight problem (i.e., higher parent-internal LOC) attended fewer sessions [11].

The association between belief in powerful other people and treatment outcome is significant, given the prominent role that professionals play in facilitating treatment. This study suggests that parents who place confidence in powerful others such as treatment providers have children who are more successful in treatment. Perhaps more confidence in powerful others indicates a greater willingness on the part of parents to accept and implement professional recommendations that a structured treatment program provides. Parents who rated themselves as more responsible for the child's weight problem had children with marginally less successful outcomes in treatment. Further, parents who rated themselves as more responsible for the child's weight problem had children with significantly poorer attendance.

1.1 Life Perception and depressive symptomatology in parents of Children with Cancer

In general, the literature converges upon two major facts. The first is that the most difficult period for parents and families happens just after the diagnosis [12], when child undergo several invasive medical procedures (e.g., bone marrow aspirates, lumbar punctures) and treatments (e.g., chemotherapy). Several studies showed that the acute phase is the most stressful period for parents [13], during which a new family "reality" must be built up [14].

The second point highlighted by the literature is that, unfortunately, a notable percentage of parents are not able to make a pathway for good adjustment and quality of life and remain indelibly scorched by the experience: increased negative emotions such as anxiety, depression, insomnia or somatic and social dysfunction shortly after diagnosis are found [15]. Post-traumatic stress symptoms (PTSS) incidence is high in the first month of therapy [16] and generally throughout the first 6 months of therapy and it can be stable along time [17]. Social support received by mothers help them to have a good perception of their lives and is associated with less psychological symptoms and was predictive of PTSS [18].

Another important predictor of depression can be health locus of control. Some people believe that their health status is controlled by themselves, they believe that they stay or become healthy as a result of their own behavior (called internal health locus of control). Others believe that their health status is controlled by powerful others or chance, so factors that determine their health are ones over which they have little control (called external and chance health locus of control, respectively) [19]. Perceived control might decline after cancer diagnosis and during the process of aging [20]. Still, the relationship between internal control and psychological adjustment to cancer remains largely unknown [21]. What we do know is that to a large extent, perception of control can be taught. Overall, the internal health locus of control in older patients with cancer was associated with higher risk of depression while the external 'powerful others' locus with a lower one [22]. A significant relationship between perceived threat and depression was found only among participants reporting low levels of

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internal locus of control [22]. These findings support the hypothesis that perception of cancer as life threatening is an important factor in determining the level of depression among cancer patients. Moreover, the differentiation between internal and external HLC suggest that internal HLC may be more relevant than external HLC in managing perceived threat. Internal locus of control can be interpreted as having a sense of agency and mastery which is important in managing the cognitive perception of the threat of illness [23].

1.2 Research Questions and Hypothesis

We formulated the following research questions:

(1) Which is the situation of life perceptions and depressive symptomatology after 1 month of therapy?

In this acute first phase we expect to find low scores in parents' Current Life Perceptions, basing on the above mentioned literature as it appears to be the most difficult period for parents (i.e., [15]). Also we expect a high incidence of depressive symptomatology that could be predictive for PTSS [18].

(2) Which beliefs parents have about health locus of control (HLOC) in relation to the child's disease factors after 1 month from the diagnosis communication? Are there more internal or external styles?

There are no specific studies on parental Health Locus of Control in the context of pediatric cancer. Basing on the literature on Health Locus of Control in general, we expect that parents would show higher scores both in the Internal Locus of Control (such as their parenting role and in their psychological resources), and in the External Locus of Control (such as health professionals or God). We hypothesize that parents' Internal Locus of Control is related to a positive perception of their life and that parents consider Children's influence more important with children's increasing age.

(3) Could the type of Parental HLOC influence the depressive symptomatology and life perceptions in parents?

The negative emotional life perceptions could impact on depressive symptomatology. Dealing with health locus of control we do not have a clear idea which type of locus of control (internal *vs* external) may dampen depressive symptomatology or negative life perceptions. We also expect that negative life perceptions and depressive symptoms could be worse in parents whose children are affected by Acute Myeloid Leukemia (AML) than Acute Lymphoblastic Leukemia (ALL), basing on the severe prognosis of the former ones.

2. Materials and Methods

Participants included 104 parents of children with leukemia after the first month from the diagnosis communication recruited at the Haematology–Oncology Clinic of the Department of Child and Woman Health, University of Padua. All parents were Caucasian with a mean age of 37.28 years (SD = 5.89; range: 19-58), mostly mothers (87.5%) and with a mean education expressed in years of 12.16 (SD = 3.82; range: 5-20). Parents' incomes were mostly average (55.3%), followed by high (23.3%) and low (21.4%) for Italian norms, but above poverty. The average of job hours/weekly was mostly around 35 (28%) and 45 (22%). Some parents were temporarily relieved of their work or were housewives (44.7%). The parents who participated were mostly mothers (N = 91) and only a few were fathers (N = 13), because the mothers were more proximal to the child during hospitalization while fathers stayed with other siblings or continued to work to maintain the family. In the preliminary analysis we controlled the possible differences between fathers and mothers. There were no significant differences in all the variables considered, so we decided to consider them all together.

Children's average age was 5.94 years (SD = 4.12, range = 1 year-17 years), 50 females and 54 males. The majority of children were affected by ALL (N = 87), while 17 had AML.

2.1 Procedure

The present study was part of a major research project entitled: "Family factors predicting the short- and long-term adaptation and quality of life in children with leukaemia" approved by psychological research Ethical Committee, 2313 protocol number. The parents were contacted by a clinical psychologist during the first hospitalization of the children. The project aims were explained, and informed consent was asked for. Informal contacts with the participants were kept up on a daily basis to provide support and motivation for the project. The participants were informed that they were free to drop out at any moment of the study. A socio-demographic information, a Ladder of life questionnaire, BSI-18 and Parental Health Locus of Control (PHLOC) were administered to parents 1 month later.

2.2 Instruments

Ladder of Life (CCSS)

The parent had to evaluate, using a 1 to 10 points scale, the quality of her/his present life, the quality of her/his life 5 years before the child's disease and how satisfying her/his life will be in the future (5 years later from the son's/daughter's diagnosis). With this instrument, we can obtain information about individual perception of the past, the present and the future. It has been administered to 118 Italian mothers of children with cancer, demonstrating good global internal consistency (Cronbach's alpha = 0.73) [17].

PHLOC [2]

It is a 30-items questionnaire assessing parent's type of internal or external locus of control with respect to child's health. The PHLOC was used to assess parents' beliefs about the health of his/her child. Child's wellbeing can depend on destiny (absolutely not controllable), on external information sources (pediatric staff), or on parent (fully controllable). The questionnaire assesses beliefs of Child, Divine, Fate, Media, Parental, and Professional influences over child's health. For example, the Fate subscale provides an index of the extent to which parents believe that the health status of their child is predominantly a matter of luck (e.g., Whether my child avoids injury is mostly a matter of luck). The American standardization (2) showed internal consistency reliability coefficients above .70 for all scales and test-retest (r) correlations all above .60, confirmed by the Italian standardization that showed good internal consistency of the sub-scales ($r > .70$), and adequate test-retest correlations ($r > .80$) (24).

Socio-demographic and Medical Data

Each parent filled in a socio-demographic questionnaire with inquiries into their highest year of schooling, their education, their perceived economic situation, their type of home situation, their romantic relationship and their type of employment.

BSI-18 (25)

The Brief Symptom Inventory 18 (BSI-18) consists of 18 items grouped into three dimensions of six items, serving as a screening for depression, somatisation and anxiety. Respondents are asked to refer about how they felt the last 7 days, and each item is rated on a 5-point Likert scale from 0 (not at all) to 4 (extremely). BSI-18 was used to assess psychological outcomes in parents of children under treatment for leukemia [18], demonstrating good internal consistency for both the Global score (Cronbach's alpha = 0.92) and the specific domains (Depression: alpha = 0.84; Somatization: alpha = 0.83; Anxiety: alpha = 0.83).

3. Results

3.1 Parent's Current, Future Life Perceptions and depressive symptomatology after 1 month

(1) Which is the situation of life perceptions and depressive symptomatology after 1 month of therapy?

To answer this question, we run descriptive statistics. Current life perception was really low at T1 (Mean = 4.43; range 1-10), even if there was a big standard deviation (SD = 2.21) that underlined the variability of parent's emotive state. Future life perception was instead reported at high levels, with a mean of 8.03 (SD = 2.03). Depressive symptomatology in parents was in average 2.29 (SD = 0.99; range 1-4.83) with 0.22% reporting high levels (from moderately to extremely) and with the majority (0.88%) with none or low levels.

3.2 Parental Health Locus of Control: internal or external adoption

(2) Which type of locus of control parents have after one month from the communication of the cancer diagnosis of their children?

To answer this question, descriptive statistics were run on the several types of parental locus of control (Table 1). We can note that Parental influence, an internal locus of control, was the most used, even if also Medical staff influence and Divine influence, external ones, were frequently reported.

Table 1. Descriptive statistics of parental locus of control styles on child's illness.

Locus of control styles	Range	Mean	SD
Parental influence	1-6	4.35	0.79
Medical staff influence	1-6	4.30	0.83
Divine influence	1-6	4.03	1.64
Child influence	1-6	3.13	0.97
Fate influence	1-6	2.97	1.21
Media influence	1-6	2.56	1.27

Once we have divided the health locus of control of parents into internal and external categories we wanted to verify if parents adopted more internal or external styles towards the health of their children. Paired-samples test t (t = -14.42; df=103; p=0.0001) showed that the external PHLOC scales (Mean = 7.48; SD = 1.52) were more adopted than the internal ones (Mean = 10.81; SD = 2.55).

3.3. Pearson's Correlations between Parental Health Locus of Control, Life Perceptions, Depressive symptomatology, Socio-Demographic and Illness Factors

(3) What happens to parents' locus of control, in relation to child's disease and socio-demographic factors and to their psychological health, in the second month after the diagnosis communication?

Pearson's correlations in Table 2 show the significative associations between the above-mentioned variables. Child's type of leukemia (r = -0.302; p = 0.02), child's age (r = 0.23; p = 0.017) and parent's age (r = 0.211; p = 0.02) were significantly associated with parental current life perceptions (Table 2): younger parents of children with AML and with a younger age judged their lives as worse.

Child's age was positively associated with the child's influence on health control. Findings reveal a significative association within the scale of parental health locus of control between Parental influence, Medical staff influence and Child influence. Fate and Divine influence were instead related to each other.

Depressive symptomatology in parents was significantly associated with current life perception (r = -0.51; p = 0.0001) and negatively with future life perceptions (r = 0.46; p = 0.0001). Health locus of control of parental influence (r = -0.21; p = 0.02) and medical staff influence (r = -0.35; p = 0.0001) were associated with parental depressive symptomatology.

Current life perception at the diagnosis was significantly associated with all the three scales of parental health locus of control cited above.

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Moreover, significative correlations were found between internal locus of control and the following variables: child's age (r = 0.20; p=0.03), Parental current life perception (r = 0.40; p = 0.001), Parental Depressive symptomatology (r = -0.23; p = 0.01). External locus was correlated moderately only with Parental current of life perception (r = 0.20; p = 0.04).

Table 2. Pearsons' correlations between Parental Health Locus of Control, Life Perceptions, Depressive symptomatology, Socio-Demographic and Illness Factors

	Parental influence	Fate influence	Divine influence	Child influence	Medical staff influence	Media influence	Parental current life perception	Parental future life perception	Parental BSI depression
Child's current Age	-.047 .635	.053 .595	.212* .032	.360** .0001	.063 .524	-.108 .275	.233* .017	.038 .706	-0.20* 0.02
Child's type of leukemia	-.190 .053	-.138 .161	.094 .347	-.053 .590	-.060 .543	.076 .443	-.302** .002	-.123 .215	0.07 0.42
Parent's Current Age	.011 .913	.036 .719	-.014 .889	.079 .425	-.043 .667	-.003 .974	.211* .002	-.123 .215	-0.20* 0.02
Parent's gender	-.187 .058	-.052 .597	.056 .574	-.040 .688	-.046 .643	-.203* .039	-.169 .087	-.052 .598	0.01 0.86
Parent's schooling years	-.098 .327	.039 .698	-.054 .589	-.074 .547	-.201* .041	.155 .119	-.195* .049	-.135 .175	0.08 0.36
Parental influence		.042 .676	.049 .626	.477** .0001	.379** .0001	-320** .001	.373** .0001	.152 .125	-0.21* 0.02
Fate influence			.289** .003	.185 .059	.152 .124	.098 .324	.152 .122	.088 .379	0.04 0.62
Divine influence				.164 .100	.172 .083	.090 .368	.149 .135	.108 .281	-0.01 0.88
Child influence					.316** .001	.332* .001	.327** .001	.095 .338	-0.19 0.05
Medical staff influence						.167 .091	.277** .004	.189 .056	-0.35** 0.0001
Media influence							-.001 .991	-.009 .932	-0.04 0.68
Parental Current life perception								0.54** 0.0001	-0.51** 0.0001
Parental Future Life perception									-0.46** 0.0001

* p value < 0.05 ** p value < 0.01

3.4. Significant Predictors of Parental current life perception and depressive symptomatology

Then we run hierarchical regression analysis entering the child (age, type of leukemia) in the first step, parents' socio-demographic factors (age, gender, years of schooling) in the second step, parental health locus of control typology in the third one to identify the best predictors of Parental current life perception.

The first model was the best one (R2 = 0.13; F2 = 8.34; p = 0.0001), with child age (ß = 0.28; p = 0.003) and child diagnosis (ß = -0.26; p = 0.007) impacting significantly on Parental current life

perception (Table 3). Furthermore, the third model explained a more proportion of variance with only parental influence as predictor (ß = 0.25; p = 0.03).

Table 3. Hierarchical regression models predicting Parental current life perception

Step	Variables	R^2	ΔR^2	F	p	β	p
1	Child's demographic and illness factors	0.13	0.15	8.34	0.0001		
	Child diagnosis					0.28	0.003
	Child age					-0.25	0.007
2	Parental socio-demographic factors	0.15	0.05	4.59	0.13		
3	Parental health Locus of control strategy	0.25	0.13	3.96	0.01		
	Parental influence						
						0.25	0.03

Another regression analysis measured the possible factors associated with parental depressive symptomatology entering the child (age, type of leukemia) and parent's socio-demographic factors (age, gender, years of schooling) in the first step, parental current and future life perceptions in the second step, parental health locus of control typology in the third one.

The third model explained the most proportion of variance (R2 = 0.34; p=0.04) with Parental Current Life perception (β = -0.28; p = 0.015), Future life perception (β = -0.28; p = 0.005) and Medical Staff influence (β = -0.28; p = 0.004) impacting upon parental depressive symptomatology (Table 4).

Table 4. Hierarchical regression predicting Parental depressive symptomatology

Step	Variables	R^2	ΔR^2	F	p	β	p
1	Child's and parent's socio-demographic factors	0.02	0.07	1.78	ns		
2	Parental life perceptions	0.28	0.26	6.45	0.0001		
	Current life perception					-0.31	0.004
	Future life perception					-0.30	0.004
3	Parental health Locus of control strategy	0.34	0.09	4.82	0.04		
	Current life perception						
	Future life perception					-0.28	0.015
	Medical staff influence					-0.28	0.005
						-0.28	0.004

4. Discussion

There is a huge literature on the psycho-social consequences of child cancer on parental well-being and quality of life. Literature shows that mothers with older AML children hospitalized for more days, with less education, with more stressful life events and with more cognitive problems in the first weeks after the diagnosis are at major risk of Post-Traumatic Stress Symptoms [17]. The most difficult period for parents happens just after the diagnosis [13] when child undergoes several invasive medical procedures (e.g., bone marrow aspirates, lumbar punctures) and treatments (e.g., chemotherapy), and when a new family "reality" must be built up [14].

Unfortunately, a notable percentage of parents are not able to make a pathway for good adjustment and quality of life and remain indelibly scorched by the experience [26], showing anxiety or depression levels higher against normative data [15]. At this purpose, parental life perceptions could be a valid instrument to easily screen the parental psychological health as we have showed in a previous study [18]. For these reasons we wanted to know how parents perceive life in relation to child's disease and demographic factors after 1 month from the diagnosis communication.

In this acute first phase we expected to find lower scores in parents' current life perceptions and a high intensity of depressive symptomatology, basing on the existing literature. We also hypothesized that some factors could impact on parents' perceived life, like the type of diagnosis

(with parents of children with AML having more troubles than those of children with ALL), the child's age (parents of older children being much more worried) [17] and parents' age (with a best situation with increasing age).

Our findings confirmed partially these hypotheses: Child's diagnosis and child's age significantly influence parents' current life perceptions, but not parents' age. Parents of children with AML perceive a current worse life than parents of children with ALL. This finding is also sustained by the literature [27, 17]. As far as child's age concerns, we found that older age is a negative factor impacting on a worse negative parental current life perception. At this purpose, we can argue that the increasing age of the child is positively associated with more psychological difficulties [28], with the consequence to put in crisis parents in their caregiving role, increasing the possible negative psychological outcomes.

There are no specific studies on parental health locus of control in the context of children with cancer. Basing upon the literature on health locus of control, we expected that parents invested a lot on both internal and external locus of control styles. At this purpose parents surprisingly adopted more external locus of control than internal ones. Probably children's cancer put parents in an impotence state due to the extreme illness uncertainty and they have to rely on medical staff, media, T.V., internet source that give them a sort of security on their children's health.

As a result, we studied the associations between parents' locus of control and their own life perceptions and child's disease and demographic factors after one month from the diagnosis communication. Our findings showed that parental influence (a type of internal locus of control) is the most reported, followed by these external health control dimensions: Medical staff influence, divine influence and child influence. Then we found that parent's current life perception was predicted by parental influence one-month post diagnosis. Parents think that they can act to ameliorate their life satisfaction probably due to their emotional coping strategies in the first period of hospitalization.

On the other side, another finding showed that parental depressive symptomatology was influenced by parents' current and future life perceptions and their Medical staff influence locus of control style. Current life perception gives us a measure to identify parents more in difficulty in their parental role and self-esteem about caring the child during the illness. Positive future life perception can be considered such a measure of hope that appears a protective factor in developing depressive symptomatology. Medical staff influence is confirmed as an important health locus of control style that help parents to dampen their possible depressive status.

This information should be taken into consideration by health professionals to understand the degree of therapy compliance and to implement their perceptions about having an active role in controlling their child's health. Communication strategies adopted by health professional in their relationship with parents could help in all treatment phases [29]. From a recent study on adult cancer patients [23] we know that Internal Health Locus of Control might be more relevant than External one in managing perceived threat and the psychological functioning, so it is fundamental to implement this also in parents of children with leukemia. This is confirmed in our study for positive life perceptions, but not for depressive symptomatology where the protective factor derives from the external 'powerful others' locus [22], specifically the medical staff influence.

5. Conclusions

Parents report low indices of current life perception in the first month of therapy, even if the depressive symptomatology has a higher intensity only in 22% of them. Parents of older children with AML that have a minor adoption of parental influence health locus of control have a lower current life perception.

Type of parents' health locus of control can be a stable factor that influence depressive symptomatology, specifically the perceived media influence, together with current and future life perceptions of parents. These empirical data could give some suggestions for health professionals in their psychological support following two directions. The first one consists in improving parental

Peer-reviewed version available at Children 2020, 7, 40; doi:10.3390/children7050040

trust in the staff and medical care. The second one deals with dampening parental impotence so to increase their self-esteem in helping children to improve their daily health.

Author Contributions: Conceptualization, M.T. and S.B.; methodology, S.B.; formal analysis, M.T. and L.T..; resources, A.B.; data curation, M.P., MC.P.; writing—original draft preparation, M.T.; writing—review and editing, L.T..; visualization, A.B.; supervision M.P., MC.P..; funding acquisition, S.B. and M.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Istituto della Ricerca Pediatrica Città della speranza and Department of Developmental and Social psychology that sponsored the research grant of the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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