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Influence of family functioning on internalizing problems in children of parents with CMC.

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Contents

Abstract

This cross-sectional study examines the implications of parental chronic medical condition (CMC) on children's internalizing problems and family functioning. Eighty families - 80 ill parents, 80 healthy spouses and 128 children from 10 to 20 years old (52.3% female) - participated in the study. Both parents completed the Interactional Problem Solving Inventory (IPSI) to measure the quality of marital relation, and the Parent-Child Interaction Questionnaire-Revised (PACHIQ-R). Children completed the Inventory of Parent and Peer Attachment (IPPA) measuring parental attachment, and the Youth Self-Report (YSR) to examine internalizing problems. Four-stage hierarchical multiple regression was performed twice with adolescent internalizing problems as the outcome variable, marital relationship, parent-child interaction and parent attachment as predictors, and adolescent age and gender as covariates. Results indicated that higher quality of family functioning (marital relationship, parent-child interaction and parental attachment) was related to less internalizing problems in children. Parental attachment emerged as the most important predictor; female gender was also significant. Older adolescents (15-20 years old) and girls reported more internalizing problems than younger children (10-14 years old) and boys. Our results suggest that a systemic approach should be adopted when considering the effects of a CMC on the family and its members. What is more, secure attachment should be enhanced since it appeared to be a protective factor against adolescent internalizing problems in families of a parent with a CMC.

Keywords: parental CMC; family functioning; adolescent; internalizing problems; attachment

Introduction

1. Family functioning in families of a parent with a chronic medical condition (CMC)

Families are the primary source of care, support and social interaction for children, which will influence the child's emotional, cognitive and social development (Hayden et al., 1988; Minuchin, 1985). Between 4 to 12% of children and adolescents live with a parent who suffers from a CMC (Razaz, Nourian, Marrie, Boyce, & Tremlet, 2014). Increasing evidence suggests that parents with a CMC face several difficulties on a daily basis (e.g., hospitalization, pain, depression, etc.) that can have an adverse impact on their children's adjustment and family functioning (Pakeham & Cox, 2012, 2014; Pedersen & Revenson, 2005). The illness is likely to modify family routines and the distribution of household roles, while possibly contributing to the decline of financial resources and changes in the physical or emotional availability of the parents (Jantzer et al., 2013; Vannatta, Ramsey, Noll, & Gerhardt, 2010). Due to these disruptions, children of a parent with a CMC are at an increased risk of developing internalizing problems (anxiety, depression, fear, social withdrawn, somatic complains and body concerns), externalizing problems (aggressive and rule-breaking behavior) and elevated stress levels (Bogosian, Moss-Morris, & Hadwin, 2010; Diareme et al., 2007; Razaz et al., 2014; Sieh, Visser-Meily, & Meijer, 2013). These children also perceive their families to be less cohesive and tend to report greater family conflict and tension (Bogosian et al., 2010, Pakeham & Cox, 2012; Peters & Esses, 1985). In the current study, family functioning is operationalized by means of three interpersonal variables: quality of marital relationship, quality of parent-child interaction and quality of parent attachment.

1.1. Quality of marital relationship

Quality of marital relationship refers to the ability of couples to solve interactional problems in an active and constructive manner (Lange & van der Endec, 1998). In the context of a CMC, the couple needs to engage in a constant negotiation over the illness, causing tension and pressure in their interaction (Lewis, Hammond, & Woods, 1993). Some of the issues that the couple may struggle with vary from practical matters such as economic sustenance or household roles, to marital issues such as physical and emotional intimacy. In a study of breast cancer patients, couples who

managed to flexibly integrate their illness-related demands into their daily routine reported better marital adjustment. On the contrary, couples who modified their approach to daily challenges less frequently indicated poor marital adjustment (Lewis et al., 1993). In addition, the quality of marital relationship was associated with the quality of parent-child relationship (Hayden et al., 1988). Mothers who reported lower marital adjustment were more disengaged, less responsible and sensitive to their offspring (Dickstein et al., 1998). Similarly, marital dissatisfaction was related to temperament and behavioural problems, school failure, etc. in children (Hayden et al., 1988; Lewis et al., 1993). Sieh, Meijer and Visser-Meily (2010) found that at two months post-rehabilitation after a parental stroke, low quality of marital relationship was linked to adolescent stress. However, research on the influence of the quality of marital relationship on adolescent adjustment is still inconclusive (Sieh et al., 2012a; Vannatta et al. 2014).

1.2. Quality of parent-child interaction

The quality of parent-child interaction concerns the attitudes and behavioral interaction (acceptance and conflict resolution) between parents and children (Lange, Evers, Jansen, & Dolan, 2002). The quality of parent-child interaction has been proven a critical determinant of adolescent well-being, serving as a protective or risk factor (Bogosian et al., 2010; Lewis et al., 1993; Sieh et al., 2012a). In the context of a CMC, ill parents may exhibit less emotional and physical availability, inconsistent parenting, increased fatigue and irritability towards their offspring (Vannatta et al., 2014). In addition, children may see an upsurge of responsibilities, household chores, caregiving tasks and may have to provide emotional support to both ill and healthy parents. This is what Wells and Jones (2000) termed *parentification*, that is, a reversal of roles between parent and child. These alterations could be potential sources of strain for children. Pakenham and Cox (2012) proposed that role redistribution and its consequent burden could produce conflict between the parent and the children. Yahav, Vosburgh, and Miller (2005) indicated that children of parents with multiple sclerosis (MS) reported higher levels of anxiety, fear, burden, concern and commitment to their parents than children from healthy parents. As a result children presented a more flexible and protective behavior towards their parents, setting aside their own personal needs. Furthermore, Vannatta et al. (2014) found that in families of a mother with breast cancer, parental warmth and acceptance toward their children was associated with less

behavioral problems. Likewise, the relationship between the child and the healthy parent plays an important role in the child's adjustment. Their interaction may entail a safe space to express questions, concerns, or feelings about the illness and ill parent's behavior (Lewis et al., 1993). Hence, if both parents are supportive to their offspring, it may serve as a protective factor.

1.3. Quality of parent attachment

According to Bowlby's attachment theory, primary caregivers serve as secure figures when they are available and respond in a consistent and responsive manner to their children's needs (Bowlby, 1982). During adolescence, attachment develops from the need to proximity to availability; the intensity and frequency of the attachment behavior declines and it becomes more complex and reciprocal (Kerns, Mathews, Koehn, Williams, & Siener-Ciesla, 2015). In this study, the quality of parent attachment refers to the adolescents' perceptions of how well their parents serve as sources of psychological security, taking into account mutual trust, communication, anger and alienation. Particularly, communication seems to be an important factor associated with children's adjustment (Diareme et al., 2007; Razaz et al., 2014; Rolland, 1999; Vannatta et al., 2014; Yahav et al., 2005). When children are unaware of the parent's situation, they may display high levels of anxiety, distress, fears and fantasies as they detect tension in the family without being aware of the source. Children have the need of information about the parent's illness, challenges in the family and possible consequences (Yahav, et al., 2005). Being able to discuss the illness openly and more directly - according to their stage of development - allows children to ask questions and express their emotions and feelings (Rolland, 1999). However, research about parent attachment as a whole was found to be inconsistent. Sieh et al. (2012a) provided evidence that high quality of parent attachment was associated with lower levels of adolescent stress. Further research of the same authors concluded that parent attachment in children of parents with a CMC did not differ from that of children of healthy parents (Sieh et al., 2013). Similarly, Pakenham and Cox (2014) did not find significant differences in parental attachment in children with a parent suffering from MS compared to children from healthy families. Further research is necessary.

2. Family systems theory

The role of the family is crucial when our main focus is child development. In order to have a comprehensive understanding of family functioning, it is necessary to adopt a systems perspective. Minuchin (1985) posed the following family systems principles: (1) Families are complex systems of interacting, interrelated and interdependent individuals that cannot be understood in isolation from the rest of the family system (Miller, Ryan, Keitner, Bishop, & Epstein, 2000). (2) The pattern of interaction between family members is circular rather than linear. For instance, an overprotective father creates anxiety in his daughter by not providing enough information about the illness, which increases the unrealistic fantasies and fears of the daughter, which exacerbates the father's concern, and so forth (see Figure 1).

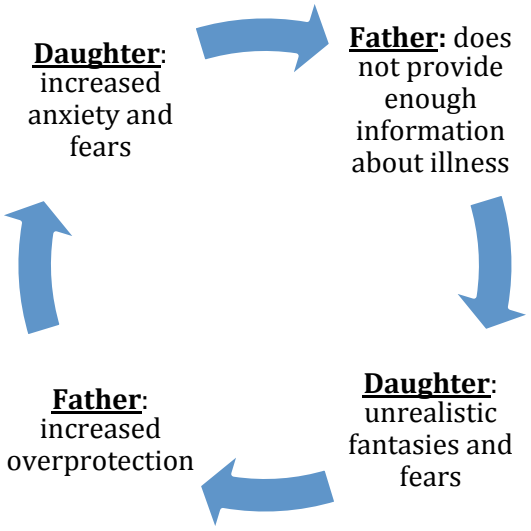

Figure 1. Circular interaction pattern

(3) The system contains homeostatic mechanisms to maintain stability. Families perform adaptive self-regulation processes in order to reestablish familiar equilibrium. When a family is dysfunctional, symptoms and maladaptive behavior are included in the self-regulation processes. Those become essential characteristics of the system increasing family rigidity. For instance, the auto-destructive drinking behavior of the oldest son of an ill parent and the resulting family conflict may prevent the family from dealing with the parental illness and its possible fatal consequences. (4) Families are considered to be open systems when they are willing to challenge their established patterns. They do this by exploring alternatives to develop new patterns that are more

complex and appropriate to the modified circumstances, as can be seen in families with parental CMC. 5) Each individual and the interaction between individuals are considered subsystems. Hence, the family is a complex system composed of the spouses subsystem, parent-child subsystem, sibling subsystem, etc. (6) The subsystems are separated by boundaries, and the interactions across boundaries - within and between the subsystems - are regulated by rules and stable patterns maintained by all the family members (see Figure 2). Dysfunctional families have problems in maintaining the boundaries or increasing flexibility depending on the changing needs.

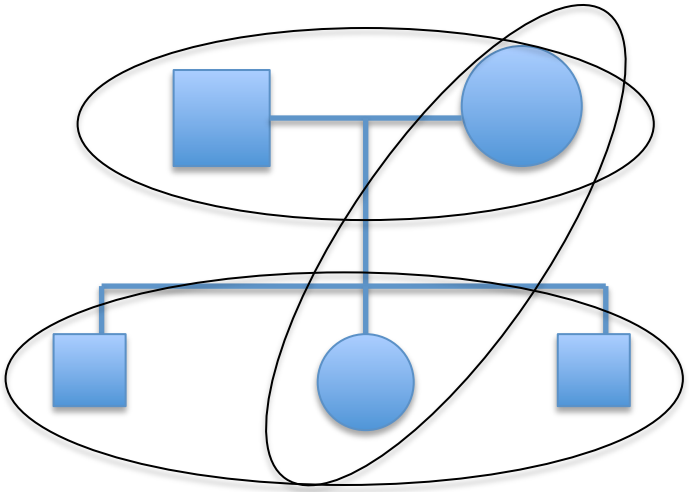

Figure 2: Family system diagram: marital, parent-child and siblings subsystems are represented by circles.

3. Internalizing problems in children

Parental chronic illness affects not only the functioning of the family system but also children's emotional adjustment (Bogosian et al., 2010; Diareme et al., 2007; Pedersen & Revenson, 2005; Razaz et al., 2014; Sieh et al., 2013). Children may present feelings of guilt, worry, fear, isolation and psychosomatic complaints such as headaches, cramps, and debilitated immune responses (Pakenham & Bursnall, 2006; Sieh, Meijer, Oort, Visser-Meily, & Van der Leij, 2010a). These symptoms are operationalized as internalizing problem behavior consisting of anxiety, depression, socially withdrawn behavior, somatic complaints and body concerns (Achenbach, 1991; Mesman & Koot, 2000; Visser et al., 2007). Other studies such as Pakenham and Cox (2014), demonstrated that youth of a parent with MS did not show greater problems in health, somatization, behavioral problems, attachment and family functioning than youth from healthy families. Jantzer et al. (2013) posed that the parental illness did not

constitute a risk for internalizing problems in their offspring. That was congruent with previous findings (Visser et al. 2007) where internalizing and externalizing problems, presented in children of parents with cancer, decreased with time even below the level of the comparison group. These children experienced increased appreciation for life and family as well as stronger personal relationships, while tending to be less worried about usual issues people their age experience (Lindqvist, Schmitt, Santalahti, Romer, & Piha, 2007). Nevertheless, various meta-analysis (Bogosian et al., 2010; Razaz et al., 2014; Sieh et al., 2010a) proved that children of parents suffering from a CMC displayed internalizing problems, which can persist into adulthood. Moreover, these problems are more prevalent than externalizing problems (e.g. aggression and delinquent behavior).

4. Children's characteristics: age and gender

Previous research states that internalizing problems in children are related to child characteristics; however, the extent to which this relation occurs in the context of parental CMC has been less well documented. According to Diareme et al. (2007), children's internalizing response to parental illness varies depending on their developmental stage: infancy, toddlerhood, preschool age, latency age and adolescence. Particularly, adolescence is characterized by separation-individuation and identity formation processes, in which adolescents struggle between the need for support and closeness with the parents, and the need for autonomy in order to construct their own independent identity (Yahav, Vosburgh & Miller, 2007). Due to parental CMC, these normal developmental processes may be hindered, creating a conflict between the adolescent's needs and the parent's needs. Frequently, the increase of responsibilities and additional roles, and the expectation of having to be more physically and emotionally available for both the ill and healthy parent occur more commonly among adolescents. These children also hide their own needs, struggles or feelings in favor of their parents' needs. Research suggested that adolescents may experience greater ambivalence about their desire of independence, separation anxiety, concerns about their body image, shame about the ill parent's disability, and resentment of increased responsibilities at home (Diareme et al., 2007). Similarly, Bogosian et al. (2010) concluded that adolescents (11-18 years) were at a greater risk of maladjustment than younger children. On the contrary, other studies indicated that older children have greater cognitive and social resources to cope with parental CMC than younger children. Adolescents may adapt to parental illness more easily because of their

previous exposure to stressors and their tendency to view negative experiences as opportunities for personal growth (Pakeham & Cox, 2014; Pedersen & Revenson, 2005).

Regarding gender, Sieh, Visser-Meily, Oort, and Meijer (2012b) confirmed that girls reported more internalizing problems than boys in the subclinical spectrum, yet that gender difference was less pronounced in children of a parent with a CMC than the control group. In addition, internalizing problems were positively correlated with increased caregiving and household responsibilities in daughters. In this line, Pedersen and Revenson (2005) suggested that the child would be more likely to adopt the role of the ill parent if he or she is the same gender as the parent. Therefore, daughters of ill mothers often feel more pressure than daughters of ill fathers. Contrarily, Yahav et al. (2005) found that daughters experienced a greater sense of burden when their fathers were ill, and the same occurred with sons when their mothers were ill. Since findings are inconsistent, both age and gender should be controlled for with regard to children's internalizing behavior problems.

5. Research aim and hypotheses

The aim of this thesis is to examine whether family functioning is associated with adolescent internalizing behavior problems in families with a chronically ill parent. Based on the current literature, the first research question is whether the quality of marital relationship, parent-child interaction and parental attachment in families of a parent with a CMC are associated with children's likeliness to present internalizing problems. The second research question is whether gender and age explain a part of the internalizing problems in children with ill parents. Accordingly, we hypothesize that (H1) high quality of marital relationship, (H2) parent-child interaction and (H3) parent attachment would be related to less internalizing problems in children of parents with a CMC. Moreover, (H4) girls are expected to present more internalizing problems than boys and (H5) adolescents (15-20 years) are more likely to report higher internalizing problems than younger children (10-14 years).

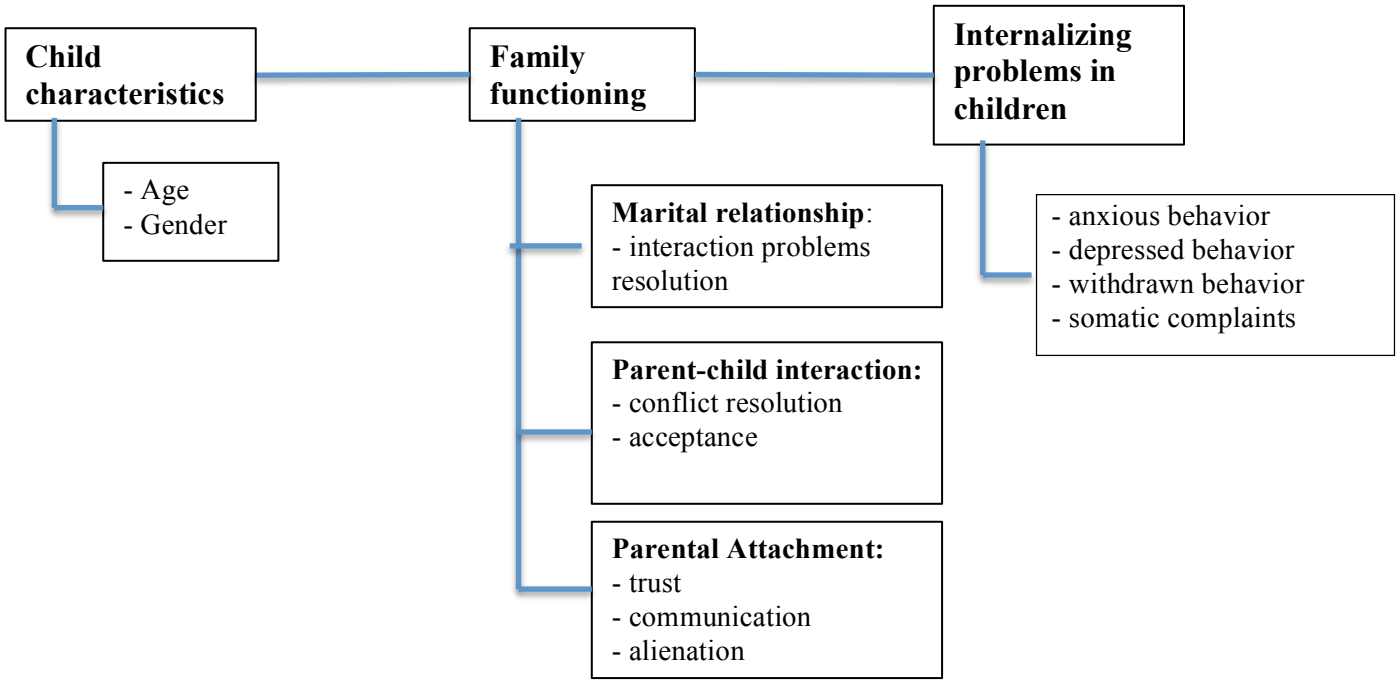

Figure 3: Predictive model of family functioning, child characteristics and adolescent internalizing problems.

Methods

1. Design

For this cross-sectional study, data were collected by Sieh et al. (2012) between 2008 to 2012, resulting in the dissertation entitled *the impact of parents' chronic medical condition on children*. Relevant literature was found using several search engines such as SAGE Journals, EBSCOhost, PsycARTICLES, Pubmed, Web of Science, Google Scholar and Leiden University's catalogue, using terms such as parental illness, family functioning, attachment, adolescents, marital relationship and parent-child.

2. Participants

Inclusion criteria for children were to be aged between 10 and 20 years, to live with both healthy and ill parent, and to live in the Netherlands with a proficient level of Dutch. Having a serious chronic illness, mental illness, cognitive disabilities, or substance abuse were part of the exclusion criteria for children. The inclusion criterion for ill parents was to cohabit with a healthy partner and to suffer a disease or traumatic injury that involves at least one organ system, impairing the health of the parent for a

minimum of 6 months (Sieh et al., 2012a). Cancer was excluded because this disease is not considered chronic by definition.

A total of 104 families with parental CMC participated in the study: 160 children and adolescents, 104 ill parents and 83 healthy spouses. Sixteen families (16 parents and 21 children) were excluded since the family unit was formed by a single parent or presented a long distance relationship. Two children were excluded since they did not meet the parental cohabitation's criterion. The duration criterion was not met for one ill parent. We also excluded families with both parents suffering from CMC: we considered that these families would indicate a distinctive family functioning compared to families formed by one healthy and ill parent. Two family members and their families were excluded since their personal information and part of the questionnaires were not completed. Figure 4 summarizes the recruitment of participants.

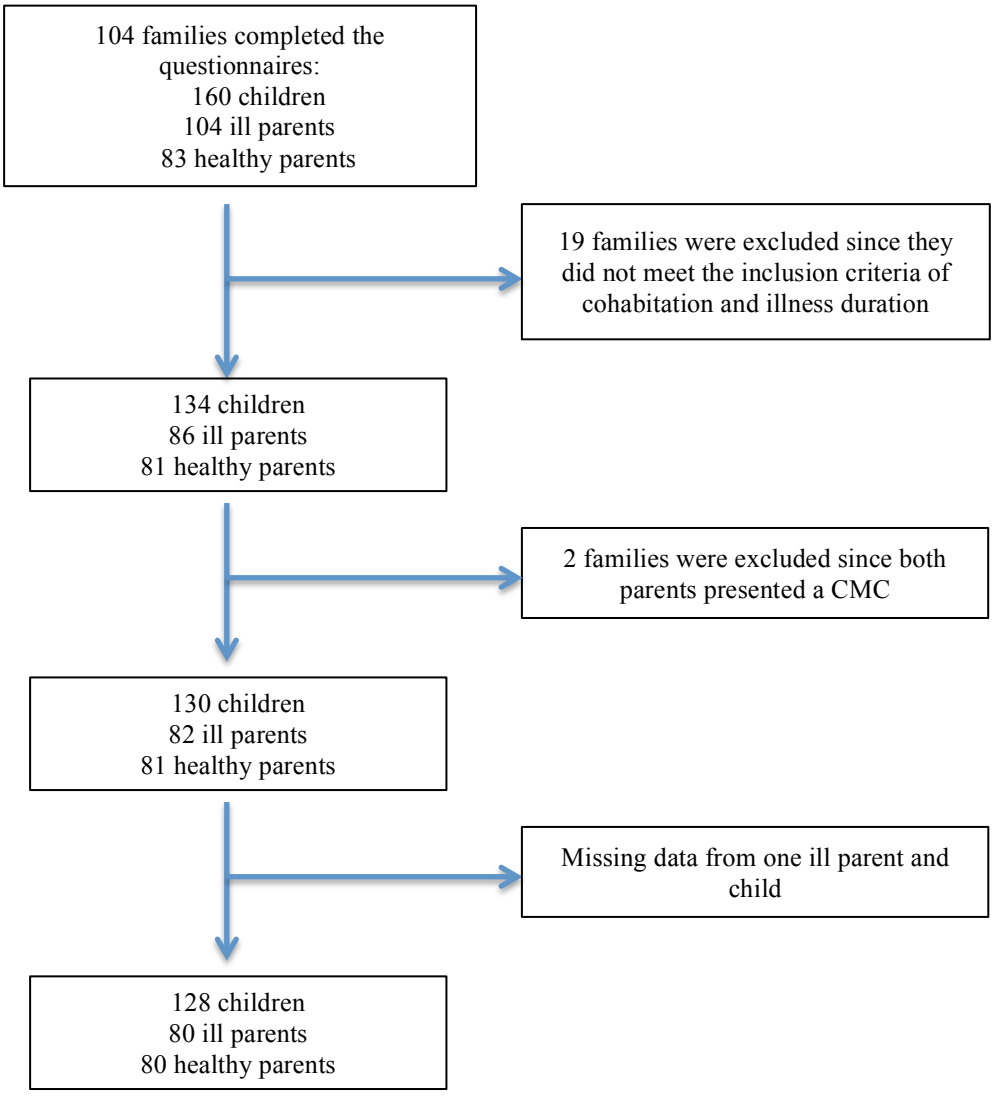

Figure 4. The flow diagram of recruitment

3. Procedure

Families with parental CMC were recruited across the Netherlands in schools, hospitals, health organizations, rehabilitation and community centers, and public places using brochures and posters. Families had to contact the researchers to show their interest in participation. Once the active informed consent was signed, research assistants visited the families at home to administer the questionnaires. Children who completed the measurements received a cinema voucher. The ethical commission of the research institute of Child Development and Education of the University of Amsterdam approved this study.

4. Measures and instruments

4.1. ***Demographic variables.*** Information was obtained on gender, age, school type, employment status, family size, and illness type and duration.

4.2. ***Family functioning.*** Family functioning was conceptualized as quality of marital relationship, parent-child interaction and parent attachment.

The quality of marital relationship was measured with the Interactional Problem Solving Inventory (IPSI; Lange, 1983), which consists of 17 statements describing the ability of couples to solve their problems (5-point Likert scale from 1 = *exactly applicable to me/my partner* to 5 = *absolutely not applicable to me/my partner*). One of the statements is "In our relationship there are many problems which we are unable to solve". Low scores suggest that the couple is not able to cope appropriately with problems in their relationship. Sieh et al. (2012a) considered the score 68.5 to be the cut-off point between low and high quality of marital relationship. Lange and Van der Ende (1998) demonstrated that the IPSI is reliable (Cronbach's alpha > .90); the correlation between the rating of both partners was revealed to be consistently high (r >.90). In the current study, Cronbach's alpha was .91 for ill parents and .90 for healthy parents.

To assess the quality of parent-child relationship, both parents completed the Parent-Child Interaction Questionnaire-Revised (PACHIQ-R; Lange et al., 2002). The PACHIQ-R consists of 21 items (5-point Likert scale; 1 = *completely inapplicable*, 5 = *exactly applicable*), which were used to compute two subscales: *conflict resolution* (12 items; α = .90 to .93) and *acceptance* (9 items; α = .78 to .81). The first subscale included items such as "I don't accept criticism from…" or "There are many conflicts

between … and me which cannot be solved". The second subscale included items such as "I'm very proud of …" or "I take my time to listen to …". Lange et al. (2002) reported internal consistency coefficients from α = .86 and α = .93 for the PACHIQ-R. In the current study, Cronbach's alpha was .87 for ill parents (.74 and .82 for the respective subscales) and .81 for healthy parents (.62 and .78 for the subscales respectively).

The quality of parent attachment was assessed with the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). Twelve items (4-point Likert scale; 1 = *almost never or never true* to 4 = *almost always or always true;* α = .88) were extracted from the IPPA to assess attachment with the father (α = .85) and with the mother (α = .87) in three dimensions: *mutual trust* (e.g., "My mother accepts me as I am"), *communication* (e.g., "I tell my mother about my problems and troubles"), and *anger and alienation* (e.g., "I get upset easily around my father"). Higher scores of trust, communication and reversed items of alienation indicated higher quality of attachment with the father or mother. Guarnieri, Ponti, and Tani, (2010) reported a Cronbach's alpha from α = .72 to α = .92. In the current study the scales indicated good reliability: communication with mother (α = .77), trust in mother (α = .75), alienation from mother (α = .73), communication with father (α = .71), trust in father (α = .75), and alienation from father (α = .72).

4.3. ***Internalizing problems.*** The Youth Self-Report (YSR; Achenbach, 1991) was used to assess internalizing problems in adolescents. The YSR consists of 112 items of which 105 items are covered in nine syndrome scales, which compute internalizing, externalizing, and a total problem score. In this study, only the internalizing scores (i.e., anxious/depressed behavior, withdrawn/depressed behavior and somatic complaints) were used (31 items, α = .91). Adolescents rated their internalizing problems (e.g., ''I feel worthless or inferior'') on a 3-point scale ranging from 0 = *not true* to 2 = *very true or often true*. The reliability for the internalizing scale in this study was α = .90. Raw scores were transformed into T-scores (mean = 50 and *SD* = 10), which allowed comparing scores on each scale with the normative sample of the same gender. T-scores above 63 indicated a clinical range, between 60 and 63 reveal a subclinical range, and below 60 indicated a normal range.

4.4. ***Children's gender and age.*** Gender and age were dichotomized with the following scores: (1) male and (2) female; younger children from 10 to 14 (1) and adolescents from 15 to 20 (2).

5. Data Analysis

Hierarchical multiple regression was performed to answer the research questions. We examined the relation between the three predictors (parent-child interaction, parent attachment and marital relationship) and the outcome variable, including age and gender as covariates.

Normal Quantile-Quantile Plots were examined to determine normal distribution and identify outliers; if they affected the normal distribution significantly they were winsorized (Tabachnick & Fidell, 2001). Missing data were considered to be missing completely at random (MCAR) as less than 5% of the data were missing. We used Expectation-Maximization imputation. Descriptive statistics were conducted for all variables, including means, standard deviations, and range of scores. Independent and paired-samples *t*-test were performed to compare values between ill and healthy parents, girls and boys, and young children and adolescents. Effect sizes were calculated by means of eta squared (Pallant, 2013). The magnitude of these effect sizes was interpreted using Cohen's guidelines: small effect (.01), medium effect (.06) and large effect (.14).

Prior to the regression analyses, bivariate correlations were calculated between adolescent internalizing problems, marital relationship, parent-child interaction, parental attachment and adolescent age and gender (see Table 3). The values of Pearson's correlation coefficients and its respective significance levels gave a first insight into the relationship between predictors and the outcome as face validity for the assumption of multicollinearity. The assumptions of normality, homoscedasticity, linearity, normal distribution of errors and independent residuals were also checked (Miles & Shevlin, 2001). We displayed a plot of standardized residuals against standardized predicted values, where the residuals should be dispersed randomly and evenly around zero to meet the assumption of homoscedasticity, linearity and random errors. The Durbin-Watson test was used to test the assumption of independent residuals, where a value of 2 would indicate that the residuals are uncorrelated. For an exhaustive diagnosis of multicollinearity, we ran the variance inflation factor (VIF), which indicates whether a

predictor has a strong linear relationship with the other predictors; and tolerance, which indicates the extent to which a specific predictor cannot be predicted by the rest of the predictors.

Four-stage hierarchical multiple regression was performed twice with adolescent internalizing problems as the outcome variable. In Model 1, adolescent age and gender were entered at Stage 1 to control for the effects of these covariates. Parent-child interaction was entered at Stage 2, parent attachment at Stage 3, and marital relationship at Stage 4. The family functioning variables were entered in order of their importance in predicting the outcome (Field, 2009; Miles & Shevlin, 2001) as the theoretical background suggests: quality of parent-child interaction has been proven a critical determinant of adolescent adjustment, while the influence of quality of parental attachment and quality of marital relationship are still inconclusive. The first model was improved in Model 2: adolescent age and gender were entered at Stage 1, parent-child interaction's subscales (conflict resolution and acceptance) were entered at Stage 2, parental attachment with father and mother's subscales (communication, trust and alienation) at Stage 3, and marital relationship at Stage 4.

We examined R^2 and the increase of R^2 in each step for both models, which indicated the amount of variance in adolescent internalizing problems explained by each predictor. In order to determine whether changes in R^2 were significant, we analyzed the change statistics, observing the F-change and its significance ($p < .05$). Moreover, we examined the parameters of the models. The unstandardized b-values indicated the amount of change in adolescent internalizing problems that would be expected for a change of one unit in a specific predictor if the effects of all other predictors were held constant. The standard error of each b-value indicated how different these values would be across different samples, enabling us to calculate the range of values in which a true population value is likely to be found (95% two-tailed confidence intervals). To determine whether each predictor was statistically significant, meaning whether the b-value differs significantly from zero, we analyzed the t-test and the probability associated ($p < .05$). More importantly, we examined the standardized beta-values, which allowed us to compare the importance of each predictor in the model. The analyses were performed with IBM SPSS statistics, version 21.0. All tests were two-tailed.

Results

1. Descriptive statistics

Demographic characteristics of participants are presented in Table 1. Gender and age of children were almost equally distributed (52.3% female and 50.8% children were from 10 to 14 years old). The proportion of female ill parents was 62.5. The average illness duration was close to 12 years, ranging from 1.5 to 49 years; with multiple sclerosis being the most prevalent CMC. Both ill parents and healthy parents were mostly highly educated. The average number of children living at home per family was 2.10.

Table 1
Demographic Characteristics of Children and Parents

	n (%)	*M (SD)*
Children	128	
Female	67 (52.3)	
Age		14.99 (2.27)
Education level	128 (100)	
Primary education	21 (16.4)	
High school	86 (67.3)	
Lower vocational education	16 (12.5)	
Intermediate vocational education	2 (1.6)	
University	2 (1.6)	
Other	1 (0.8)	
Ill parents	80	
Female	50 (62.5)	
Age		46.76 (7.70)
Illness duration		11.92 (11.09)
Illness type		
Neuromuscular disease	13 (16.3)	
Rheumatoid arthritis	15 (18.8)	
Parkinson disease	5 (6.3)	
Stroke	7 (8.8)	
Diabetes	1 (1.3)	
Spinal cord injury	6 (7.5)	
Brain damage	5 (6.3)	
Multiple Sclerosis	24 (30)	
Inflammatory bowel disease	4 (5)	
Healthy parents	80	
Female	26 (32.5)	
Age		47.90 (5.71)
Currently working	67 (85.1)	

Table 2 displays the means for family variables. The mean quality of marital relationship was under the cut-off score (68.5; Sieh 2012a) indicating poor marital relationship on average. Over 58% of ill parents scored below the cut-off score, while 63.8% of the healthy parents were under the cut-off score. The combined average of quality of parent-child interaction was similar to the normal population (M = 88.82, SD = 6.59; Sieh 2012a). An independent t-test revealed that the quality of parent-child interaction according to healthy parents was higher than according to ill parents, $t(140.29) = 3.60$, $p < .001$. The differences presented a medium size effect (eta squared = .07; Tabachnick & Fidell, 2001). Similarly, healthy parents scored higher in the subscale conflict resolution than ill parents $t(158) = 5.50$, $p < .001$, presenting a large effect (eta squared = .16). In addition, a paired-samples t-test demonstrated that attachment with mothers was higher than attachment with fathers, $t(127) = 4.70$, $p < .001$ and displayed a large effect (eta squared = .14).

Table 2.
Means, Standard Deviations and Range of Marital Relationship, Parent-Child Interaction and Parental Attachment

	Ill parents		Healthy parents		Total	
Variable	*M (SD)*	Range	*M (SD)*	Range	*M (SD)*	Range
Quality of marital relationship	66.73 (11.43)	40-85	61.90 (12.83)	27-84	64.31 (10.95)	34-85
Quality of parent-child interaction	86.04 (8.19)	64-99	90.04 (5.65)	101-76	88.04 (5.33)	75-99
Conflict resolution	48.30 (4.36)	36-55	51.81 (3.71)	29-44	50.05 (3.23)	43-58
Acceptance	37.74 (4.76)	27-45	38.23 (3.39)	60-43	37.98 (2.85)	32-44
	Father		Mother			
Quality of parental attachment	38.18 (5.37)	26-48	40.26 (5.36)	28-48	39.22 (4.74)	27-48
Communication	10.02 (2.84)	4-16	11.88 (2.92)	4-16	10.95 (2.56)	4-16
Trust	13.67 (2.15)	8-16	13.84 (2.16)	7-16	13.76 (1.93)	8-16
Alienation	14.41 (1.69)	9-16	14.34 (1.82)	8-16	14.38 (1.50)	9-16

Table 3 shows the Pearson coefficients of correlations between the predictors (marital relationship, parent-child interaction and parent attachment), the outcome variable (adolescent internalizing problems) and children's gender and age. Internalizing problems in adolescents were significantly related to all the predictors although only quality of parental attachment (r = .40, p < .01) exhibited a medium correlation while the other variables showed small correlations. The size of correlations between the family functioning variables varied from medium to large, and all of them were significant. Specifically, quality of marital relationship and quality of parent-child interaction presented a large positive correlation, r = .53, p < .01. Older children and girls were more prone to report internalizing problems; however, the correlations were small. The quality of parent-child interaction and parental attachment were significantly related to the children's age; however, gender did not correlate with any family functioning variables.

Table 3. *Correlations between Family Functioning, Adolescent Internalizing Problems and Adolescent Characteristics*

	1	*2*	*3*	*4*	*5*	*6*
1 Adolescent internalizing problems	-					
2 Quality of marital relationship	-.13*	-				
3 Quality of parent-child interaction	-.20*	.53**	-			
4 Quality of parent attachment	-.40**	.37**	.46**	-		
5 Adolescent age	.17*	-.11	-.23**	-.33**	-	
6 Adolescent gender	.18*	-.03	-.01	-.03	.04	-

Note. *p< .05. **p<.01.

Males and females aged 10-14 years scored in the normal range with the exception of one subclinical case (see Table 4). Clinical cases were only present in adolescents from 15 to 20 years old (8.6%), mainly in girls. Overall, girls displayed more internalizing problems [M = 10.85, SD = 8.55; t(126) = 2.02, p = .05] than boys (M = 7.95, SD = 7.59). Similarly, the difference in scores between adolescents from 15 to 20 (M = 10.55, SD = 9.33) and younger children from 10 to 14 [M= 7.41, SD = 4.92, t(125,98) = 2.49, p =.01] was significant. The magnitude these differences was small (eta squared = .05 and .03 respectively).

Table 4

Internalizing Problems in Younger Children and Adolescents: Clinical, Subclinical and Normal Cases

	Young children 10-14		Adolescents 15-20		Total	
	Boys	Girls	Boys	Girls		Range
N	21	23	40	44	128	
Raw scores						
Total internalizing problems *M (SD)*	7.97 (6.37)	8.88 (6.99)	7.93 (8.78)	12.88 (9.60)	9.47 (8.21)	0-40
Withdrawn	1.97 (1.84)	2.06 (1.63)	2.37 (2.48)	2.67 (2.68)	2.27 (2.18)	0-11
Somatic complaints	2.32 (1.99)	2.65 (2.81)	2.43 (3.03)	4.18 (3.15)	2.91 (2.86)	0-13
Anxious/depressed	3.77 (3.98)	4.32 (4.01)	3.27 (5.47)	6.45 (5.58)	4.49 (4.91)	0-27
T-scores						
Total internalizing problems *M (SD)*	46.24 (5.89)	46.46 (5.96)	48.51 (10.41)	52.56 (12.44)	49.16 (10.21)	39-87
Withdrawn	47.13 (6.54)	47.56 (7.68)	48.64 (9.90)	53.88 (11.49)	50 (10)	40-85
Somatic complaints	47.48 (7.54)	48.98 (6.96)	50.61 (10.90)	51.18 (11.44)	50 (10)	40-90
Anxious/depressed	46.48 (5.76)	47.49 (5.93)	48.39 (11.09)	53.30 (13.29)	49.60 (10.80)	41-96
Normal n (%)	20 (95.2)	23 (100)	37 (92.5)	34 (77.3)	114 (89.1)	
Subclinical n (%)	1 (4.8)	-	-	2 (4.5)	3 (2.3)	
Clinical n (%)	-	-	3 (7.5)	8 (18.2)	11 (8.6)	

Note. T-scores > 63 indicated clinical cases, T-scores between 60–63 indicated subclinical cases, and T-scores < 60 indicated normal cases.

2. Hierarchical multiple regression analyses

Preliminary analyses were performed to test the assumptions of multiple regression analysis. An examination of correlations between the independent variables revealed no correlations higher than .7 (Tabachnick & Fidell, 2001). Any tolerance values were higher than .10 and VIF values were smaller than 10, confirming the absence of perfect multicollinearity (Field, 2009). The inspection of Normal Quantile-Quantile Plots indicated distributions close to normality in all variables, except for the outcome variable that deviated from normality. The Durbin-Watson test was close to 2, indicating that the assumption of independent residuals was met. Values of Cook's

distance, leverage and Mahalanobis distance demonstrate that there were no extreme cases among the residuals. The scatterplot of standardized predicted values against standardized residuals indicated that the assumptions of linearity and homoscedasticity were met.

Hierarchical multiple regression revealed that at Stage 1, adolescent age and gender contributed significantly to the regression model, $F(2,125) = 3.82$, $p < .05$, and both covariates accounted for 5.8% of the variation in internalizing problems (see Table 5). Introducing parental attachment in Stage 3 explained an additional 10.6% of the variation in internalizing problems and this change was significant, $F(1,123) = 16.13$, $p < .001$. Parent-child interaction and marital relationship added a small percentage of variation in the outcome variable (2.7% and 0.01%, respectively) and these changes were not significant. Together the five independent variables accounted for 19.2% of the variance in internalizing problems. When all five independent variables were included in Stage 4, only adolescent gender ($t(122) = 2.05$, $p < .05$) and parental attachment ($t(122) = -4.00$, $p < .001$) were significant predictors of internalizing problems, the latter being the most important predictor.

Table 5

Hierarchical Multiple Regression Analysis predicting Internalizing Problems from Child Characteristics and Family Functioning

	B	*SE B*	*β*	R^2	ΔR^2
Step 1				.06	
Constant	-3.58	5.16			
Adolescent age	0.59	0.32	.16		
Adolescent gender	2.80	1.42	.17		
Step 2				.09	.03
Constant	22.19	14.13			
Adolescent age	0.44	0.32	.12		
Adolescent gender	2.80	1.41	.17*		
Quality of parent-child interaction	-0.27	0.14	-.17		
Step 3				.19	.11***
Constant	31.59	13.72			
Adolescent age	0.12	0.31	.03		
Adolescent gender	2.72	1.33	.17*		
Quality of parent-child interaction	-0.03	0.15	-.02		
Quality of parent attachment	-0.66	0.16	-.38**		

Step 4				.19	.00
Constant	32.77	14.13			
Adolescent age	0.11	0.31	.03		
Adolescent gender	2.74	1.33	.17*		
Quality of parent-child interaction	-0.05	0.16	-.03		
Quality of parent attachment	-0.67	0.17	-.39**		
Quality of marital relationship	0.03	0.07	.04		

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

To improve our model we included the subscales of parent-child interaction (conflict resolution and acceptance) and parental attachment with father and mother (communication, trust and alienation) in a new model, see Table 6.

At Stage 1 and 2, age, gender and the parent-child interaction's subscales contributed significantly to the regression model explaining 5.8% and 5.5% of variation in internalizing problems, respectively. Adding the attachment subscales with father and mother to the regression model in Stage 3 explained an additional 33.6% of the variation in internalizing problems and this change was significant, $F(6,117) = 11.88$, $p < .001$. Finally, the inclusion of marital relationship did not explain any additional percentage to the variation in the outcome variable. Adolescent gender and conflict resolution were significant predictors of internalizing problems at Stage 2; however, when the attachment subscales were included in Stage 3, only attachment with mother was a significant predictor, with alienation from mother being the most important ($t(117) = -4.60$, $p < .001$). Together all independent variables accounted for 45% of the variance in internalizing problems.

Table 6

Hierarchical Regression predicting Internalizing Problems from Child Characteristics, Parent-Child interaction's subscales, Parental Attachment's subscales and Marital Relationship

	B	*SE B*	*β*	R^2	ΔR^2
Step 1				.06	
Constant	-3.58	5.16			
Adolescent age	0.59	0.32	.16		
Adolescent gender	2.80	1.42	.17		
Step 2				.11	.06*
Constant	27.48	14.41			
Adolescent age	0.37	0.32	.10		
Adolescent gender	2.82	1.39	.17*		
Conflict resolution in parent-child interaction	-0.74	0.28	-.28**		
Acceptance in parent-child interaction	0.25	0.30	.09		
Step 3				.67	.34***
Constant	50.41	12.71			
Adolescent age	-0.05	0.27	-.01		
Adolescent gender	1.03	1.19	.06		
Conflict resolution in parent-child interaction	-0.02	0.24	-.01		
Acceptance in parent-child interaction	0.22	0.25	.08		
Communication with father	-0.27	0.32	-.09		
Trust in father	0.23	0.44	.06		
Alienation from father	-0.80	0.51	-.16		
Communication with mother	0.78	0.34	.27*		
Trust in mother	-1.10	0.47	-.29*		
Alienation from mother	-2.24	0.49	-.50***		
Step 4				.67	.00
Constant	51.80	13.00			
Adolescent age	-0.07	0.27	-.02		
Adolescent gender	1.07	1.20	.07		
Conflict resolution in parent-child interaction	-0.08	0.27	-.03		
Acceptance in parent-child interaction	0.21	0.25	.07		
Communication with father	-0.30	0.32	-.10		
Trust in father	0.23	0.45	.06		
Alienation from father	-0.81	0.51	-.17		
Communication with mother	0.78	0.34	.28*		
Trust in mother	-1.11	0.47	-.29*		
Alienation from mother	-2.22	0.49	-.49***		
Quality of marital relationship	0.03	0.06	.05		

Note. *p<.05, **p< .01, ***p<.001

Discussion

This thesis examined the associations between family functioning, child characteristics and adolescent report of internalizing problems in families with a chronically ill parent.

Results show that higher quality of marital relationship, parent-child interaction and parental attachment as well as adolescent characteristics were significantly related to less internalizing problems in adolescents, although they indicated small and medium correlations. As expected, adolescent age and gender explained a small, but significant, part of the internalizing problems. Girls and older children (15-20 years old) reported more internalizing problems than boys and younger children (10-14). Contrary to our hypotheses (H1 and H2), only quality of parental attachment and adolescent gender appeared to be significant predictors of adolescent internalizing problems. Previous findings are inconsistent about the role of parental attachment and parent-child interaction (Lewis et al., 1993; Pakenham & Cox, 2014; Sieh et al., 2012a). In our study, the quality of parental attachment - and not the quality of parent-child interaction - has been proven a crucial determinant of adolescent internalizing behavior problems. Children's sense of emotional security, which is derived from parental involvement, acceptance, and predictive and constructive parenting, seems to be a risk and protective factor for adolescent psychological adjustment (Demidenko, Manion, & Lee, 2015).

Although significantly, quality of marital relationship was weakly correlated to adolescent internalizing problems and did not explain any of its variance. This is consistent with findings from King, Radpour, Naylor, Segal, and Jouriles (1995), who found no relationship between marital conflict and adolescent level of internalizing problems but associated marital conflict with inconsistent parenting. Likewise, our study reveals that high quality of marital relationship is strongly related to high quality of parent-child interaction and moderately associated with high quality of parental attachment. Due to the nature of correlation analyses, it is not possible to draw any causal conclusions. High marital satisfaction may foster a positive and constructive parent-child interaction, as some literature conveys (Dickstein et al., 1998; Hayden et al., 1988), or the ability of solving problems and acceptance within a parent-child interaction may stimulate high marital satisfaction. Nevertheless, the course of the illness has an impact on the couple's adjustment and spouse's functioning: role changes, expectations about life plans, sexual difficulties, guilt, depression, etc. (De Judicibus &

McCabe, 2004; Peter & Esses, 1985). In our study, healthy parents reported poorer quality of marital relation compared to ill parents. Because healthy parents take over additional roles that were presumably shared with the spouse before the illness (i.e., rearing their children, caregiving tasks, household and financial responsibility, etc.), they may experience a sense of loneliness that affects the perception of marital relationship.

When parent-child interaction's subscales (conflict resolution and acceptance) were introduced in Model 2, conflict resolution appeared to be a significant predictor of adolescent internalizing problems. However, when parental attachment was added to the model, conflict resolution was not a significant predictor anymore. These findings suggest that attachment may mediate the relationship between parent-child interaction and internalizing problems in adolescents. However, this indirect effect is beyond the scope of this article and should be properly tested. Moreover, ill parents presented lower levels of conflict resolution than healthy parents. A possible explanation is that role redistribution, increased caregiving and household tasks experienced by the offspring are direct consequences of the ill parent's condition; therefore, children may express their dissatisfaction more openly to the ill parent. However, the child's perspective on parent-child interaction was not assessed. Another explanation is that ill parents may be more self-aware and sensitive to arguments with their children than healthy parents. Umberger, Risko, and Covington (2015) described that children of parents with disabling chronic pain struggle with assuming adult roles (e.g., emotional and physical care, increased responsibility of the household and working obligation) and parental mood changes, leading to experience negative feelings towards their parents such as resentment, bitterness, confusion, helplessness, etc. Similarly, ill parents encountered feelings of regret, sorrow, guilt, detachment and anger due to the hardships their children have to deal with. Nevertheless, the overall average of parent-child interaction in our study was similar to that of the normal population, suggesting that the positive interaction between healthy parents and children balances the interaction challenges that ill parents and children may experience. Hence, this relation may serve as a protective factor against adolescent internalizing problems in families of a parent with a CMC (Lewis & Darby, 2003).

Quality of parental attachment appeared to be the most important variable of our predictive model. Attachment displayed medium correlations with marital relationship, parent-child interaction and adolescent internalizing problems, and a small correlation

with adolescent age. It is noteworthy that attachment with the mother was higher than attachment with the father. In addition, all three subscales of attachment with the mother - but not with the father - were significant predictors of internalizing problems in adolescents, especially alienation from mother, which explained the majority of the variability in the outcome variable. Despite the majority of mothers from this sample were suffering from a CMC, children still considered them a source of psychological security. Our results provide more evidence for attachment theory than for our model (see Figure 3). According to attachment theory, children develop a secure attachment when the primary caregiver is emotionally available and demonstrates sensitive parenting (Bowlby, 1982). Children are more prone to depression and anxiety when parents are emotionally rejecting, inconsistent, neglectful, and poorly communicative (Demidenko, et al., 2015; El-Sheikh & Buckhalt, 2003; Herring & Kaslow, 2002). Due to the illness-related demands, parents suffering from a CMC may not be able to respond in a consistent manner and be neither emotionally nor physically accessible to their children, increasing the risk of adolescent internalizing problems (Rolland, 1999).

Concerning child characteristics, older children (15-20 years old) showed lower quality of parent-child interaction and parental attachment, and more internalizing problems. Coinciding with the normal developmental stage of adolescence, children may engage in more conflicts with their parents and feel more alienated as a consequence of their search for autonomy and identity formation (Diareme et al., 2007; Jantzer et al., 2013; Yahav et al., 2007). Because of the development of abstract thinking, older adolescents are more aware of the process and consequences of a CMC. Parents may also be more willing to share information about their illness, as well as expressing further emotional and practical worries, once their children are older (Compas et al., 1994). In consequence, older adolescents experience an upsurge of household and caregiving responsibilities, which is related to the presence of internalizing problems. However, the increment of internalizing problems during adolescence is not unique in children of ill parents, but it also follows the same trajectory in the general population (Bongers, Koot, Van der Ende, & Verhulst, 2003). Younger adolescents express their distress in more external means (e.g., bragging, teasing, fighting, etc.) as a way of controlling their environment. With time, the aggressive behavior transforms into more internal struggles (Timmermans, van Lier, & Koot, 2010). Although in our study older adolescents (15-20 years old) reported more internalizing problems compared to younger children (10-14 years old), adolescent age

was not a predictor of internalizing problem behavior, meaning that the upsurge of internalizing problems during adolescence may not be related to the presence of a CMC but more to the normal developmental stage of adolescence.

What is more, Bongers et al. (2003) found that internalizing problems did not differ between boys and girls during childhood, however during adolescence youth presented different developmental trajectories: girls reported higher levels of internalizing problems than boys. In our study, adolescent gender was only related to internalizing problems, and appeared to be a predictor of adolescent internalizing problems in Model 1, but not in Model 2 when parental attachment was included. This suggests that high quality of parental attachment may protect children from facing internalizing problems, even when girls are more prone to exhibit internalizing problem behavior. Indeed, girls reported more internalizing problems than boys, especially if they were between 15 and 20 years old. Because girls tend to mirror their mother's role – nurturing, providing emotional support to spouse and children, taking care of the household, etc. (Fitch, Bunston, & Elliot, 1999) – daughters likely take more responsibility for helping their parents and may consequently experience more pressure, anxiety or depression than boys (De Judicibus and McCabe, 2004; Pedersen and Revenson, 2005). Compass et al. (1994) suggested that children's level of anxiety and depression was dependent on the adolescent and parent's gender, since – apart from adopting the parent's roles - they may perceive an increased susceptibility to suffer from a CMC themselves.

1. Limitations and future directions

Our study presents some limitations. First, we did not consider parental depression in the context of a CMC, which is proven to have an enormous impact on family and adolescent functioning (Demidenko, et al., 2015; Frye & Garber, 2005; Gravener et al. 2012; Herring & Kaslow, 2002; Toth, Rogosch, Sturge-Apple, & Cicchetti, 2009). Second, the parent-child interaction should comprise both parent and child's perspective as the interpretation of this relationship may differ depending on the informant (Mesman & Koot, 2000). Although parental attachment includes some information about the child's perceptive, attachment and parent-child interaction measure different constructs. Similarly, adolescent internalizing problems should be evaluated by diverse informants: parents, teachers and peers (Sieh et al., 2012b). Third, as threats to external validity (Kazdin, 2010), family members may be influenced by the

awareness that they are participating in an investigation about family functioning and CMC. Due to the fact that the questionnaires were administered in the family home, participants – especially children – may have felt constrained by the presence of their parents. The fact that both ill parents and healthy parents were mostly highly educated may have influenced their willingness to participate in the study, and they may be aware of the importance of cohesion and openness within the family, influencing their responses (Houck, Rodrigue, & Lobato, 2007; Sieh et al., 2012b). Further, our sample only included Northern European, mainly Dutch participants. Culture may have an influence on the way families cope with the illness-related demands (Rolland, 1999). Fourth, the study presents few threats to validity: the outcome variable (adolescent internalizing problems) did not meet the assumption of normality; none of our predictors showed large correlations with adolescent internalizing problems (except for parental attachment, all of them were small), and the effect sizes of adolescent gender and age and internalizing problems were also small.

Future research should include a culturally and educationally more diverse sample. Attachment with ill parents should be more deeply examined: is attachment with the mother higher than with the father because of parental gender or because of the condition of the parent? Further, studies could examine parental attachment as possible mediator of family functioning (parent-child interaction and marital relation) and adolescent psychological well-being. Likewise, the measurement of parent-child interaction and internalizing problems should be based on multiple informants, and adolescent age and gender should be more deeply analyzed. Additionally, parental depression should be included and examined in detail: the relation with other family predictors, child characteristics and adolescent internalizing problems. Finally, as part of family functioning, sibling relationships should be taken into account. Siblings may not only serve as an important source of emotional and instrumental support to deal with parental illness and its possible consequences (Brody, 1998), but also influence the rest of family interactions.

2. Clinical implications

It is evident that a CMC not only has an impact on the patient, but also affects other family members and the whole family system. Based on our results, we consider crucial to adopt a systemic family intervention without disregarding individual therapy (Peter & Esses, 1985; Rolland, 1999). Moreover, preventive interventions should be

applied. First, parents should receive support to create a safe and supportive family environment, proving skills to deal with the alterations that may occur as a consequence of the illness. Open communication between parents and children about the illness and present and future consequences should be prioritized and enhanced (Houck, et al., 2007). Second, ill parent as much as healthy parents may need support to acquire a new meaning of the illness, marital relationship and parent-child interaction. Third, children, especially older adolescents (15-20 years old), may benefit from interventions that covered issues related to the adolescent's development (i.e., guilt about continuing one's life, need of autonomy and identity formation), coping skills (i.e., stress management, assertive communication, parentification) and dealing with the future (i.e., separation anxiety, anticipated grieving). Hence, families with an ill parent may benefit from individual, group, couple and family therapy.

3. Conclusions

In conclusion, this study indicates that higher quality of family functioning (marital relationship, parent-child interaction and parental attachment) is related to less internalizing problems. Parental attachment appears to be a crucial variable in our predictive model. Particularly, children may be neglected due to the struggles parents may face during a CMC (e.g, hospitalization, physical impairments, depression, fatigue, etc.), increasing the risk of developing internalizing problems. According to our results, adolescent's perception of alienation from the mother is the most important predictor of our model. The fact that healthy parents exhibit higher levels of conflict resolution with their children than ill parents (hence, higher quality of parent-child interaction) suggests that a constructive interaction between the healthy parent and child may serve as a protective factor of adolescent internalizing problems. Although marital relationship is not a predictor of the outcome variable, high quality of marital relationship is strongly and moderately associated with the rest of family functioning variables. Besides, healthy parents report poorer quality of marital relation compared to ill parents, suggesting that healthy parents face several adjustment problems (e.g., additional roles, sexual difficulties, depression, uncertainty about the future, grieving process, etc.); thus, they may benefit from individual and couple therapy. Furthermore, older adolescents (15-20 years old) and girls seem to be a risk group, considering they report more internalizing problems than younger children (10-14 years old) and boys. Health professionals should not only provide information about the course of the illness but

also about the alterations and adjustments the family may need to consider in order to minimize the negative effects of a CMC, specifically on children who are at risk for developing lasting psychological problems. Individual and family support from psychologist should be encouraged, since a chronic illness is an ongoing process that can have an enormous effect on the family system and its members.

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