Examining the Association Between Mentalizing and Parental Mental Health in a

Sample of Caregivers of Children with Asthma

Javier Malda Castillo[1], Claire Browne[2], and Guillermo Perez-Algorta[3]

[1]North West Boroughs NHS Foundation Trust, Halton Hospital, The Brooker Centre,

Runcorn, WA7 2DA, England. j.maldacastillo@outlook.com

[2] Manchester University NHS Foundation Trust, Harrington Building, Paediatric

Psychosocial Services, M13 9WL, England. claire.browne@mft.nhs.uk

[3]Division of Health Research, Faculty of Health and Medicine, Lancaster University, Furness

College, Lancaster, LA14YG, England. perezalg@exchange.lancs.ac.uk

Corresponding author: Dr Javier Malda Castillo

Abstract

Background: Caregivers of children with asthma are at higher risk of experiencing mental health difficulties and lower quality of life than caregivers of healthy children. Mentalizing is a psychological construct that defines the ability of understanding one's own and others' states of mind. Poor levels of mentalizing are strongly associated with a wide range of mental health difficulties such as depression, anxiety or emotional dysregulation. This cross-sectional study is the first to examine the associations between mentalizing and mental health in a sample of caregivers of children with asthma. **Method**: Caregivers of children (mean age=6.53, SD=3.72, ages 1 to 17) with asthma were recruited from social media support groups and the Asthma UK charity research bulletin. Participants completed self report measures of mentalizing, family functioning, mood and anxiety difficulties. **Results**: A total of 88 caregivers completed the full survey. Results indicated that poorer mentalizing capacity was significantly associated with poorer family functioning and increased mood and anxiety symptomatology. Poor mentalizing was significantly associated with increased levels of depression, hypomania and anxiety, explaining 16% of variance in depression and 10% of variance in anxiety. Family functioning was not a significant predictor after controlling for the effect of mentalizing. **Conclusions**: These findings suggest that mentalizing capacity might be a valued new treatment target to improve the mental health of caregivers of children with asthma. The results suggest that mentalizing could complement previously identified factors such as family functioning or asthma symptom severity in understanding caregivers' mental health. Further investigation into the role of mentalizing in the mental health of this population is warranted.

Key words: caregivers, asthma, children, mentalizing, mental health

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Asthma is a common chronic disease characterised by inflammation of the air passages, associated with recurring symptoms such as wheezing, shortness of breath or difficulties in sleeping, among others (Global Initiative for Asthma, 2017). Asthma can have a significant impact on the family unit, particularly amongst caregivers (Easter, Sharp & Hunt, 2015). The prevalence of childhood asthma in the UK is one of the highest worldwide (British Lung Foundation, 2016; Mallol et al., 2013; Mukherjee et al., 2014). Asthma has a negative impact in terms of negative economic effects on healthcare, early mortality and partial or permanent disability (Gupta, Sheikh, Strachan & Anderson, 2004; Nunes, Pereira & Morais-Almeida, 2017). In the UK, the treatment and management costs of the illness have been estimated to be as high as one billion pounds annually (Asthma UK, 2016; Mukherjee et al., 2014).

Caregiving and Mental Health

Coughing or difficulties with breathing are common symptoms of asthma attacks. These episodes can be particularly scary if a child experiences them and can color the experience of the illness as acute or dangerous, making asthma attacks different from other chronic illnesses (i.e. diabetes) where the symptoms may be less visible. The experience of lack of control when these symptoms occur, could increase the stress in the family unit and affect caregivers' mental health and morale. In a recent meta-analysis, Easter, Sharp and Hunt (2015) noted that caregivers of children with asthma reported higher prevalence of anxiety and depressive symptoms than caregivers of children without medical diagnoses. Several longitudinal and cross-sectional studies have identified significant factors that seem to contribute to mental health difficulties of caregivers of children with asthma, such as low socio-economic status (Wood et al., 2002), asthma symptom severity (Halterman et al., 2004) and impaired family functioning (Sato et al., 2013; Zhou et al., 2014).

The relationship between caregiving, mental health and children's asthma symptom severity can be considered systemic and dynamic, with back and forth effects between caregivers and the child. A multitude of research has proposed that caregivers' depression may be a significant contributor to flare-ups of asthma symptoms in children (Leiferman, 2002; Shalowitz et al., 2006; Wood et al., 2018). For instance, recent research suggests that caregivers' depression can contribute to the severity of asthma symptoms through a complicated cascade effect that produces alterations in immune modulation and autonomic regulation (Wood et al., 2018). An example of this would be that managing asthma requires a complex set of skills including preventing and responding to symptoms, medication management and communication skills to deal with healthcare providers. The mental health of caregivers with asthma may have an impact of how able do caregivers feel to cope with these challenges therefore possibly leading to misinterpreting and underestimating child's symptoms which could in turn affect the severity of the asthma outcomes.

Given the high prevalence of depression and anxiety symptoms in caregivers of children with asthma, and the impact that this might have in children's health outcomes, understanding the factors that may be associated with the development of mental health issues in these caregivers is paramount. Mentalization, a construct widely researched as a predictor of mental health problems in different clinical populations (Brent et al., 2014; Kovacs, Teglas, & Endress, 2010; Lemma, Target, & Fonagy, 2011), has been overlooked in the asthma caregiving literature. This is noteworthy because mentalization is a key psychological construct in understanding parent-infant relationships.

Mentalizing and Mental Health

The conceptualisation of mentalization emerged over two decades ago in the context of understanding attachment interactions between parents and babies (Fonagy, Steele, Steele, Moran, & Higgit, 1991). Fonagy (1989) first described it as

an ability that allows awareness of one's own and others' mental states, which in turn facilitates the understanding of behaviours, intentions, thoughts and feelings. Arguably, mentalization and attachment are intertwined and cannot fully be separated. Effective mentalizing is therefore a key element of attachment interactions because it allows parents to develop alternative understandings of their children's needs, which in turn helps to provide them with attuned responses (Fonagy et al., 1991). Several studies have demonstrated that difficulties in mentalizing are associated with different psychological difficulties including psychosis (Kovacs, Teglas & Endress, 2010), personality disorders (Bateman & Fonagy, 2013), depression (Lemma, Target & Fonagy, 2011) or anxiety, among others.

On the contrary, robust mentalizing is associated with secure attachment and resilient responses in the face of stress (Bateman & Fonagy, 2013; Fonagy, Gergely, Jurist, & Target, 2002; Luyten, Fonagy, Lowyck, & Vermote, 2012). Given that caregiving for a child with a chronic illness like asthma would possibly increase levels of stress in caregivers and the family unit, deepening the understanding of the contribution of mentalizing seems relevant. Although research shows that mentalizing is an important ability for mental health in the general population, including parents and caregivers, papers published to date have not explored mentalization with respect to the mental health of caregivers of children with asthma.

Current Study

The currently available literature suggests that asthma is burdensome and that caregivers of children with asthma are at greater risk of experiencing several mental health difficulties than their peers with healthy children. The visible aspects of the symptoms and the acute nature of asthma attacks in vulnerable children can make this chronic illness particularly stressful for the family unit.

This study is unique because it employs a sample of caregivers of children with asthma, attempting to clarify whether the relationship between parental mentalizing and mental health difficulties occurs for this population and if it does, to what magnitude after controlling for other potential predictors. The associations between competing factors such as income, family functioning, asthma symptom severity, mentalizing and parental mental health difficulties are complicated.

The aim of this paper is to to understand the possible significant associations of mentalizing with parental mood [including hypomanic symptoms as they are an understudied aspect of mood problems (Youngstron & Perez Algorta, 2015)] and anxiety, when also accounting for variables that have been previously reported to be significantly associated with caregivers' mental health such as income, family functioning and asthma symptom severity.

Although the directionality of the associations between these variables will be very challenging to establish with the current cross-sectional design, this paper will potentially pave the way for further research to deepen the understanding of the factors that are interconnected with the mental health of parents of children with asthma. Finally, this research hypothesised that greater mentalizing capacity would be significantly associated with reduced anxiety, depression and hypomanic symptoms even after accounting for competing factors previously identified by the literature. Furthermore, it hypothesized, that mentalizing would be the greatest contributor in explaining variance in models that also included income, asthma symptom severity and family functioning.

Method

Participants

A total of 247 participants provided consent to take part in the current research, a

quantitative cross-sectional study using an online survey design. Only 143 started responding to the survey, and a final sample of n=88 fully completed the survey. Analyses comparing those caregivers with complete data (n=88) with those with partial data not included in the final analyses (n=55) is provided in the result section.

In order to meet inclusion criteria, participants were at least 18 years old, understood written English and were caregivers of a child or an adolescent with an asthma diagnosis residing in the UK. Following Hermanns and Mastel-Smith (2012), caregivers were defined as adults (>18) who were providing unpaid support and were taking the main responsibility (>4 hours daily) in caring for a child or adolescent that was under 18 years of age.

Procedure

Participants were recruited online between July and October 2017. The study was advertised on the Asthma Research UK bulletin, which is distributed on a monthly basis to the registered Research and Policy (RaP) patient volunteers. The study was also advertised on UK asthma support groups on Twitter and Facebook. The advert included a link to a REDCap (Harris et al., 2009) online platform, a secure online data-collection system. The study received ethical approval by the University Research Ethics Committee (FHMREC).

Instruments

Mentalizing: The reflective functioning questionnaire (RFQ-8; Fonagy et al., 2016) was the self-report measure of parental mentalizing. It has two subscales: one regarding hypomentalizing, which assesses 'uncertainty about mental states' (RFQ-U), and one regarding hypermentalizing, which assesses 'certainty about mental states' (RFQ-C). In the RFQ-C subscale, average scores below the clinical cut off (<2) reflected difficulties in mentalizing. In contrast, in the RFQ-U subscale, average scores above the clinical cut off (>4) reflected poor mentalizing, with lower scores characterising greater ability to mentalize. This instrument has shown good test–retest reliability, with correlations ranging from r=.75

to .84 over a three-week period (Fonagy et al., 2016). The RFQ has also showed appropriate validity (Fonagy et al.,1998;2016) as established by the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). In the current study, the reliability analyses showed excellent internal consistency for the RFQ-C subscale (α=.83) and poor internal consistency for the RFQ-U subscale (α=.52). As such, for the purpose of the regression analyses, the RFQ-C subscale was employed as a measure of mentalizing. Regression models using RFQ-U are available upon request.

Family Functioning: The general functioning (GF) subscale of the Family Assessment Device (FAD; Epstein, Baldwin & Bishop, 1983) was the measure of family functioning. This is a 12-item likert scale, where average scores above 2.2 indicate family disruption. The GF has demonstrated high correlations with the overall FAD scores and can thus be used as an accurate measurement of family functioning on its own (Kabacoff, Miller, Bishop, Epstein, & Keitner, 1990; Ridenour, Daley, & Reich, 1999). This subscale has demonstrated adequate test–retest reliability (r=.71–.77) (Akister & Stevenson-Hinde, 1991; Bihun, Wamboldt, Gavin, & Wamboldt, 2002; Epstein et al., 1983; Shek, 2001).The FAD showed excellent internal consistency (α=.91) in the current sample.

Anxiety: The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item self-report questionnaire which has been widely used in research and clinical settings. It has demonstrated adequate one-week test–retest reliability (r=.75) (Beck et al., 1988). The internal consistency of the BAI was excellent in the current sample (α= .92).

Mood Disturbance: The 7 Up 7 Down Inventory (7U7D; Youngstrom, Murray, Johnson, & Findling, 2013) was the self-report measure of mood symptoms. This scale was developed as a brief self-report questionnaire measuring depressive and hypomanic symptoms. Previous research has found mean clinical scores to be <5.0 in the 7U subscale and <6.5 in the 7 D subscale.The 7U7D has demonstrated high correlations with the original

General Behaviour Inventory scale ([GBI], Depue et al., 1981) and adequate construct validity (Youngstrom et al., 2013). The 7U7D showed excellent internal consistency (α=.80) for the 7Up and (α=.90) for the 7Down subscale in this sample.

Asthma Symptom Severity: The asthma symptom severity information was collected using an adapted set of questions from the questionnaire of Halterman et al. (2004). For the purpose of the analyses, a caregiver report of the *number of asthma-free days over the last two weeks* was employed as a measure of asthma symptom severity.

Clinical and Sociodemographics Information: An electronic questionnaire designed for the purpose of this study collected clinical and sociodemographic characteristics of the participants, such as gender, ethnicity, age, number of children in the household and income, among others.

Statistical Analyses

We conducted comparisons of main demographic variables between caregivers with complete and non-complete survey data. Following a previous research strategy employed to handle missing data (Eekhout et al., 2014; Siddiqui, 2015), only cases with less than 25% of items missing in the RFQ-8, 7U7D and FAD questionnaires were included in the final sample (10% for the BAI questionnaire, Wetherell & Areán, 1997).

We conducted descriptive analyses to explore and summarise the main demographic and clinical characteristics of the final sample. We employed correlation analyses to assess the relationships between clinical and demographic variables, plus sensitivity analyses to evaluate possible influential cases (multivariate outliers). Sequential linear regression analyses were employed as the aim of the study was to examine whether mentalizing was a greater contributor to the model than previously identified predictors. The regression models included anxiety, depression and hypomania as dependent variables and income, asthma symptom severity, family functioning and mentalizing as predictors. A priori sample size

calculation indicated that in order to detect medium-to-large effect sizes in a multiple

regression with four predictors at a probability of p=0.05 and with a power of 0.80, a

minimum of 85 participants was required. All statistical analyses were conducted using IBM

SPSS statistics software, version 22.

Results

Insert Table 1

The results did not show significant differences between participants with complete

data and participants excluded due to missing data in any of the variables such as age, sex,

ethnicity, income or education among others (*ps*>.05) (Table 1).

The mean age of caregivers was 36 (SD=7.13), of children 6 (SD=3.72), 97% were

female and 94% described themselves as white. All participants were the mother or father of

the child and 85% were married or cohabiting. Sixty-nine per cent of the caregivers reported

a yearly income of £26,000 or more, and 57% had completed university education. For

further socio-demographic and clinical information of the sample please refer to table 1.

Insert Table 2

The correlations between clinical variables can be found in table 2. Most of the

correlations were statistically significant, showing small and moderate effect sizes (*r*=.01 to -

.65) and running in the expected direction. For example, hypermentalizing was negatively

correlated with depression (*r*=-.49, *p*<.001), hypomania (*r*=-.24, *p*<.05), anxiety (*r*=-.44,

p<.01) and family functioning (*r*=-.30, p<.01), whereas hypomentalizing was positively

associated with depression (*r*=.50, *p*<.000) and anxiety (*r*=0.28 *p*<.001). Given that low

scores in the hypermentalizing subscale (RFQ-C) suggest poor mentalizing, and higher scores

in the hypomentalizing subscale (RFQ-U) also suggest poor mentalizing (hypomentalizing),

these correlations suggest that the poorer the mentalizing scores, the more likely the reporting

of family functioning difficulties, anxiety and depressive and hypomanic symptoms.

Insert Table 3

When exploring whether mentalizing was significantly associated with mood disturbance in comparison with the other predictors, mentaizing remained significantly associated with caregivers' depressive symptoms. In the most stringent model, the contribution of mentalizing to explaining depressive symptoms was 16% after introducing all of the predictors in the regression.

Insert Table 4

In the case of hypomanic symptoms, mentalizing had a marginally significant contribution to the model after introducing all the predictors ($b=-.13$, $p=.050$; Table 4). These results suggest that a unit increase in mentalizing was associated with a reduction in the self-reported depression and hypomanic symptom scores.

Insert Table 5

In the last regression model regarding caregivers' anxiety, both mentalizing ($b=0.89$, $p<.001$) and asthma symptom severity ($b=-.42$, $p<.05$) were significantly associated with anxiety, although mentalizing explained 10% of the variance in anxiety, compared with children's asthma symptom severity, which only explained 3% of variance (Table 5). Similar to the regression models of depression and hypomania, increases in mentalizing units were associated with reductions in anxiety scores. Moreover, increases in the number of asthma-free days were also associated with reductions in anxiety. When using the other subscale of mentalizing (RFQ-U) as an independent variable, similar results were observed (data available under request from last author).

Discussion

This is the first study exploring mentalizing in caregivers of children with asthma. The findings show that poor mentalizing was significantly correlated with disrupted family functioning, anxiety and mood difficulties. Furthermore, mentalizing was the most important

predictor of anxiety and depressive symptoms after introducing the competing variables of income, asthma symptom severity and family functioning. Results supported our hypotheses, in that those with poorer mentalizing scores were more likely to experience greater family disruption and greater symptoms of depression, anxiety and hypomania. This provides further support for the theoretical underpinnings of mentalizing theory, in that poor mentalizing capacity is associated with greater mental health difficulties (Bouchard et al., 2008).

Mentalizing was the most significant predictor in all the models, showing medium effect sizes for depression (r=.40) and anxiety (r=.36), and a small effect size for hypomania (r=.20), indicating that higher levels of mentalizing were associated with a reduction in self-reported anxiety and mood difficulties. Mentalizing might be a buffering agent against caregivers' mental health difficulties, as previous literature has identified when looking at other client groups (Bateman & Fonagy, 2013; Fonagy & Bateman, 2016).

Asthma symptom severity also showed significant associations with anxiety in the final model, showing a small effect size (r=.17), and suggesting that mentalizing (r=.36) was the most important factor in understanding caregivers' mental health difficulties. This is important given that recent studies have focused on asthma symptom severity as a significant predictor of poorer mental health outcomes amongst caregivers (Zaky, Fouda, Samir, & Ahmed, 2016). In contrast, these results suggest that there are other factors, such as caregivers' mentalizing that require attention too. A mixed-method study suggested that losing control could be one of the dimensions associated with the burden of asthma (Guo, Gao, Guo, Wen, & Zeng, 2015). It could be argued that mentalizing is intrinsically relevant to losing control, as it supports affect regulation (Fonagy et al., 2002).

Family functioning was not a significant predictor in any of the final models. This is particularly relevant given the extensive literature examining the significant association between disruptive family functioning and caregivers' mental health in both populations with

asthma (Brown, Lambert, Hsu, & Eckman, 1998; Jackson, 1992; Kung, 2003) and without asthma (Özkaya, Çetin, Uğurad, & Samanci, 2010; Schreier & Chen, 2010; Zhou et al., 2014). However, the previous studies did not include a mentalizing measure in their research. Given that the correlations in this study showed that positive mentalizing was associated with less disruptive family functioning, it is possible that mentalizing acts a mediating factor in the relationship between family functioning and caregivers' mental health difficulties. Thus, future longitudinal studies should aim to test this hypothesis through mediational analyses.

These results are promising, as they suggest that mentalizing could be an important factor in understanding caregivers' difficulties, irrespective of their income, family functioning and the asthma symptom severity of their children. Theoretically, this can be understood in the context of mentalizing being an essential component of affect regulation in emotionally charged situations (Migdley & Vrouva, 2013), which are often present in the context of asthma caregiving duties (Bellin et al., 2013).

Clinical Implications

These results indicate that when caregivers' mentalizing capacity is compromised, the likelihood of experiencing mental health difficulties increases. Most interventions targeting caregivers of children with asthma have focused on problem-solving, psychoeducational and behavioural parenting programs or environmental triggers, among other aspects (Canino et al., 2008; Walders et al., 2006). We argued that interventions oriented towards mentalizing enhancement could be an additional option for this population. In fact, short-term parental-based mentalization interventions have yielded promising results for both clinical (Suchman et al., 2010; 2017) and non-clinical populations of parents (Hertzmann et al., 2016).

Limitations and Future Research

Although novel, this study presents some limitations. It employed an online cross-sectional design and only obtained self-reported data, which could reflect the effect of common method variance and other types of bias, such as memory bias when collecting information about asthma symptom severity (Schwarz, 2007). Although systematically validated measures of asthma severity were considered, shorter, less time consuming assessment procedures of asthma symptom severity were employed (i.e number of asthma free days in the last 14 days). This may have avoided greater attrition rates, but also may have compromised to some degree the validity when measuring asthma symptom severity. Furthermore, a similar limitation emerged with the asthma diagnosis as this was not verified by a physician report.

Mentalizing was measured using the short version of the reflective functioning questionnaire (RFQ-8). Ideally, this study would have measured parental mentalizing, rather than general mentalizing. Although general and parental mentalizing are strongly correlated, they are not exactly the same (Luyten et al., 2017). Future studies should aim to use the recently developed parental reflective functioning questionnaire (PRFQ) (Luyten, Mayes, Nijjssens, & Fonagy, 2017), which was not published until the data collection for this study was already ongoing. By employing a parental mentalizing measure, future research could further explore the possible effect a caregiver's lack of mentalization might have on childhood asthma control.

Moreover, mentalizing proponents have described the concept as a capacity that occurs largely at a more implicit or automatic level (Fonagy et al., 2002), and thus it could be argued that it is hard for people to access it through self-report questionnaires. Future studies should include both self-report questionnaires and semi-structured interviews, such as the

parent development interview (PDI) (Slade, Aber, Bresgi, Berger & Kaplan, 2004), to allow assessment of more implicit/automatic mentalizing processes.

The sample was almost entirely comprised of mothers (97%). The absence of fathers as informant caregives was consistent with asthma literature (Yamamoto & Nagano, 2015). The fact that fathers were underrepresented in this convenience sample has multiple interpretations. For instance, the absence of father figures in the asthma caregiving literature may be a reflection of certain patterns of family functioning such as mothers acquiring the role of contacting healthcare providers and searching for asthma information in social media. This family dynamic might exert more stress over mothers, possibly influencing their mentalizing capacity, especially given that mothers are also primarily responsible for the caregiving of children with asthma. Thus, future research should take into account the possible role differences in caregiving and their impact in mentalizing ability.

Furthermore, over half of the sample had completed university education, the majority were white, and 69% of the families reported incomes of £26,000 or more, which is above the median income in the UK (Office for National Statistics, 2016). Given that asthma can pose significant financial burdens in the family unit (Zhou et al., 2014) and that socio-economic status has been shown to predict worse anxiety, depression or quality of life outcomes in asthma caregivers (Annett, Bender, DuHamel, & Lapidus, 2003; Celano et al., 2008; Erickson et al., 2003; Zhou et al., 2014), future studies should attempt to include a more diverse sample.

Conclusions

The findings of this study suggest that similar to the general population, mentalizing was an important factor in understanding caregivers' anxiety and mood difficulties. Although causal inferences could not be drawn due to the cross-sectional nature of the design, the results highlight the possible existence of an overlooked psychological construct that may

influence caregivers' mental health. In doing so, the study paves the way for future research

to further address the relationship between mentalizing and mental health difficulties amongst

caregivers, as well as the effect that mentalizing deficits might have in the asthma outcomes

of their children.

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Tables

Table 1.

Participant demographics and clinical characteristics

Caregivers	Excluded Cases (N=55)	Included Cases (N=88)	x^2/t
Age, Mean (SD)	35.19 (6.24)[a]	36.68 (7.13)	t=-.1.18
Sex female, n (%)	53 (98)[b]	85 (97)	x^2=.29
Ethnicity White, n (%)	46 (85)[b]	83 (94)	x^2=3.35
Relation to child (mother or father), n (%)	51 (94)[b]	87 (100)	x^2=4.93
Income, n (%)[c]			x^2=7.40
6,000 to >26,000	18 (34)	27 (30)	
26,000 to >48,000	17 (32)	30 (34)	
48,000 and above	18 (34)	21 (35)	
Qualifications, University Studies, n (%)	26 (48)[c]	50 (57)	x^2=5.11
Marital Status, Married or cohabiting, n (%)	34 (81)[d]	64 (84)	x^2=.20
Clinical Variables			
Hypomentalizing (RFQ-U), Mean (SD)		2.48 (2.54)	
Hypermentalizing (RFQ-C), Mean (SD)		7.37 (5.13)	
Anxiety scores (BAI), Mean (SD)		36.62 (11.50)	
Family Functioning Scores (FD), Mean (SD)		23.09 (8.15)	
Hypomania Scores (7Up), Mean (SD)		3.46 (3.27)	
Depression Scores (7Down), Mean (SD)		6.53 (5.17)	

Children	Excluded Cases (N=55)	Included Cases (N=88)	x^2/t
Age, Mean (SD)	5.94 (3.67)[e]	6.53 (3.72)	t=-.89
Sex female, n (%)	19 (36)[e]	39 (45)	x^2=1.09
Ethnicity White, n (%)	44 (80)	80 (91)	x^2=3.49
Asthma Symptom Severity			
Nº days with asthma daytime symptoms, M (SD)	5.93 (4.00)[b]	5.92 (3.93)	t=.00
Nº days with with asthma night-time symptoms, M (SD)	5.76 (4.03)	5.42 (4.13)	t=.48
Nº of asthma free days, M (SD)	6.20 (5.26)[c]	6.72 (5.09)	t=-.58
Nº days Use of rescue inhaler, M (SD)	5.51 (4.42)	5.68 (4.41)	t=-.22

Note *p< 0.05, **p< 0.01 ***p<0.001, x^2=Chi Square, t=Student´s t-test, [a]n=47, [b]n=54,[c]n=53, [d]n=42,[e]n=50

Table 2.

Pearson´s r correlations between clinical variables

N=88	Hypomania	Depression	Anxiety	Family Functioning	Hypomentalizing (Hypermentalizing)	Asthma Free days	Rescue Inhaler[a]
7Up, r		.33***	.49 ***	.09	.20 (-.24*)	-.09	.14
7Down, r	.33***		.47 ***	.30 **	.50*** (-.49***)	-.02	.04
BAI, r	.49***	.46***		.18	.28** (-.44**)	-.22*	.22*
FAD, r	.09	.30**	.18		.19 (-.30**)	.05	.01
RFQ-U (RFQ-C)	.20 (-.24*)	.50***(-.49***)	.28**(-.44***)	.19 (-.30**)	-.61***	-.09 (0.08)	.15 (-.10)
Asthma Free Days	-.09	-.02	-.22*	.05	-.09 (.08)		-.65**
Rescue Inhaler Use	.14	.04	.22*	.01	.15 (-.10)	-.65**	

Note= *p<.05, **p<.01 ***p<.001, [a]Rescue Inhaler= Refers to the number of days where rescue inhaler was needed in the last two weeks

Table 3

Regression model predicting depressive symptoms (7D)

Variable	Step 1	Step 2	Step 3	Step 4	95% CI		Semipartial Correlation^2
Depression (N=88)					Upper	Lower	
Constant[a]	6.56***	6.68***	2.74	7.54***	11.51	3.57	
Income[a]	-.01	.00	-.29	-0.17	.69	-1.05	.00
Asthma Symptom Severity[a]		-.02	-.03	.01	.20	-.18	.00
Family Functioning[a]			.20**	.11	.24	-.15	.02
Hypermentalizing (RFQ-C)[a]				-.44***	-.24	-.64	.16
R^2	.00	.00	.09**	.27***			
F	.01	.02	3.01*	7.71***			
ΔR^2	.00	.00	.09*	.17***			
ΔF	.01	.04	9.00*	19.79***			

Note= *p<.05, **p<.01 ***p<.001, [a]All values are unstandardized Beta coefficients

Table 4

Regression model predicting hypomanic symptoms (7U)

Variable	Step 1	Step 2	Step 3	Step 4	95% CI		Semipartial Correlation^2
Mania (N=88)					Upper	Lower	
Constant[a]	4.66***	4.88***	3.77***	5.27***	8.06	2.48	
Income[a]	-.52	-.49	-.57	-.54	.07	-1.15	.03
Asthma Severity[a]		-.04	-.04	-.03	.10	-.16	.00
Family Functioning[a]			.05	.02	.11	-.06	.00
Hypermentalizing (RFQ-C)[a]				-.13*	.00	-.27	.04
R^2	.03	.03	.05	.09*			
F	2.97	1.66	1.69	2.28			
ΔR^2	.03	.00	.01	.04*			
ΔF	2.97	.38	1.70	3.88*			

Note= *p<.05, **p<.01 ***p<.001, [a]All values are unstandardized Beta coefficients

Table 5

Regression model predicting anxiety (BAI)

Variable	Step 1	Step 2	Step 3	Step 4	95% CI		Semipartial Correlation^2
Anxiety (N=88)					Upper	Lower	
Constant[a]	37.84***	40.42***	34.53***	44.17***	53.19	35.15	
Income[a]	-.53	-.18	-.63	-.40	1.58	-2.38	.00
Asthma Severity[a]		-.50*	-.51**	-.42*	.01	-.86	.03
Family Functioning[a]			.30*	.12	.41	-.16	.00
Hypermentalizing (RFQ-C)[a]				-.89 ***	-.44	-1.34	0.13
R^2	.00	.05*	.09*	.24***			
F	.24	2.28	2.93*	6.45***			
ΔR^2	.00	.04*	.04*	.14***			
ΔF	.24	4.30*	4.07*	15.47***			

Note= *p<.05, **p<.01 ***p<.001, [a]All values are unstandardized Beta coefficients