



Anxiety, depression and coping styles in mothers of children with cow's milk protein allergy

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Abstract

Aim: Cow's milk protein allergy (CMPA) in the infant is shown to be associated with heightened anxiety in the parents. However, depression and coping styles were not studied in parents of children with CMPA. The object of this study was to investigate the internalizing problems and coping styles in mothers of youngsters with CMPA.

Materials and Methods: The sample contained 41 subjects with CMPA and 41 subject without any chronic health problems, aged between 4 and 11 months. Anxiety, depression and coping styles of mothers were measured with Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Coping Attitudes Rating Scale (COPE).

Results: There were significant differences between the two groups in terms of anxiety and depression levels ($p < 0.001$). The mothers in the CMPA group used active emotional coping strategies less than control group ($p = 0.021$). Total breastfeeding duration of the children in the CMPA group was lower than the healthy controls ($p = 0.008$). There was negative correlation between active emotional coping scores and the time of adding supplemental food to infant's diet ($r = -0.42$, $p = 0.06$). Children who had additional food allergies breastfed less than the children who had only CMPA ($p = 0.02$).

Conclusion: Mothers of the children with CMPA are under heightened risk for anxiety and depression. Children with CMPA may be at risk for shorter duration of breastfeeding. Anxious and depressed caregivers may be referred for psychological help since the first year of life is essential for healthy psychological development of the children.



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Introduction

Cow's milk protein allergy (CMPA) is a type of food allergy in infancy with an estimated prevalence rate of 0.5-4.9%. It manifests as a transient allergy, beginning in the first 3-5 months, and tolerance develops in approximately 85% of affected children by 12 months of age [1]. CMPA is basically an immune response to milk protein, and typical symptoms of CMPA consist predominantly of gastrointestinal (diarrhea, rectal bleeding etc.) or dermatological (eczema etc.) problems [2,3]. Diagnosis is usually made with a careful history and examination (signs of atopic dermatitis, respiratory symptoms or diarrhea), but other diagnostic tests (skin prick test, IgE measurement etc.) are helpful. The gold standard method is to eliminate cow's milk protein from the baby's and mother's diet for four weeks [3]. Management of CMPA involves removing milk and milk proteins from the diet of the child and mother [4].

The adaptation of the mother and child to the restrictive diet and the symptoms related with CMPA of the baby may affect the psychology of the mother. It has been shown that caregivers of infants with CMPA have higher levels of state and trait anxiety than caregivers of healthy children, and that the child's symptom profile (respiratory problems and hematochezia) affects maternal anxiety levels [5]. Studies on anxiety levels in mothers of children with CMPA are limited; however several studies have reported higher levels of anxiety in caregivers of youngsters with food allergies [6]. Similarly, various food allergy symptoms such as food anaphylaxis, respiratory problems have been shown to be associated with increased anxiety in parents [7]. More research is needed on the anxiety levels of mothers of children with CMPA and their relationship to clinical variables.

Maternal depression is a common mental health difficulty and mothers of children with chronic diseases are at risk of depression [8]. There are studies showing that maternal depression is increased in children with food allergies [8]. As far as we know, depression in caregivers of children

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with CMPA has not been investigated in the literature. It has been shown that the younger age of the child increases parental stress in children with food allergies [6]. Depression is common in mothers during their child's first year, and a significant percentage of depressed mothers do not report these symptoms [9]. Psychosocial stressors and infant-related stressors may be an etiological factor [10]. Therefore, mothers of children with CMPA may be at risk for depression, as it often occurs in the first year of life, which is important for the healthy development of the baby. Studies on maternal depression in children with CMPA are important. Food allergies place a substantial burden on family, for instance more careful preparation of meals and restriction of social life [11]. The functioning and parenting practices of caregivers of youngsters with CMPA may also be adversely affected [12]. There are more studies on family life on parents of youngsters with food allergies, and the results suggest that caregivers of children with food allergies are overprotective and this may be related to restriction in the child's activities [13], avoidance of diagnostic procedures [14], delayed food introduction [15]. Therefore, coping strategies may be important for coping in a healthy way with the parental burden associated with food allergy. Problem-focused coping strategies have been investigated in caregivers of youngsters with chronic health problems and have been shown to be associated with positive psychological outcomes [16]. However, there is no study on coping styles of parents of children with CMPA and their association with clinical outcomes such as parental psychopathology and infant feeding practices.

The first purpose of this study was to compare maternal anxiety and depression levels between the children with CMPA and the control group. The second aim was to compare coping styles and their relationship to physical and psychological outcomes. The first hypothesis of this study is that mothers of children with CMPA will have higher levels of anxiety and depression. The second hypothesis of this study is that problem-focused coping strategies will be negatively associated with anxiety and depression scores.

Materials and Methods

Samples

This is a cross-sectional study to determine the psychological problems of mothers of children with CMPA admitted to the Pediatric Gastroenterology Clinic between February and June 2019. The study sample consisted of 41 mothers with a child with CMPA and 41 mothers with a child without chronic health problems. Diagnoses of CMPA were made in Adiyaman University Faculty of Medicine, Pediatric Gastroenterology Clinic. The criteria of the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition were used to determine CMPA diagnosis. Suspected subjects underwent different procedures (skin prick test, IgE measurement etc.) and elimination diet for four weeks. The control group was the mothers of healthy children who come to their routine pediatric appointments in the Pediatrics Clinic of the same hospital. The youngsters of mothers in the control group did not have any chronic health problems and did not undergo any diagnostic tests or diets. The inclusion criteria for

the CMPA group was having a child between 3-12 months with a confirmed diagnosis of CMPA and agreeing to participate in the study. Exclusion criteria for the CMPA group were having a chronic medical or psychiatric illness. The inclusion criteria for the control group were having a child between 3-12 months of age without any chronic disease. Exclusion criteria for the control group were having a chronic medical or psychiatric illness. The sample size was calculated with Epi Info software and the minimal sample size was found to be 31 participants with 95% power at $\alpha = 0.05$ level. Information about the study was given to all participants and a written informed consent form was signed. Ethics Committee approval was obtained from Adiyaman University Ethics Committee (Approval Date: January 22, 2019; Approval Number: 2019/1-3). The study was carried out in line with ethical guidelines according to the Declaration of Helsinki. All participants in the study completed the sociodemographic form, Coping Attitudes Rating Scale, Beck Depression Inventory, and Beck Anxiety Inventory at the clinic.

Tools

Sociodemographic form

A sociodemographic form was used to get information about age, gender, parental education, time of birth, type of delivery, number of siblings, and total duration of breastfeeding. The age to start complementary foods is defined as the first time parents give their babies food other than breast milk. Beck Depression Inventory (BDI): BDI was developed to rate depression in adults and was adapted into Turkish in 1988 [17]. BDI consists of 21 items related to symptoms of depression. Items are rated from 0-3 according to the symptom severity, and higher scores indicate more severe depression. Total score obtained by summing the 21 items of the scale. Cut-off scores for the scale are as follows: 0-9 points indicates no depression; 10-16 points mild, 17-29 points moderate and 30-63 severe depression. The Cronbach alpha value of the Turkish form was 0.80 [18].

Beck Anxiety Inventory (BAI)

BAI was developed to evaluate symptoms of anxiety in the last week [19]. The instrument is a 4-point Likert scale (0=none, 3=severe). BAI consists of 21 items and the total score can be between 0-63, and high scores indicate high anxiety. The cut-off scores of the scale were as follows: 0-17 points mild anxiety, 18-24 points moderate anxiety, 25 and above severe anxiety. The Cronbach alpha ratio was 0.93 in Turkish adaptation study [20].

Coping Attitudes Rating Scale (COPE)

The scale developed to measure various coping methods of the adults [21]. COPE is a 4-point Likert scale (1=never, 4=mostly) which consists of 60 items. The scale measures 15 different coping styles. These coping styles were then grouped under three main coping strategies. These are problem-focused (planning, instrumental support, turning to religion, and active coping); active

Table 1. Sociodemographic variables of CMPA and control group.

Variables	Patients		Controls		t or X ²	P
	N	%	N	%		
Child's gender (M/F)	18/23	43.9/56.1	22/19	53.7/46.3	0.78	0.38
Child's age (months, mean±SD)	6.63±1.66		6.93±1.94		0.73	0.23
Mother's education level (more than high school n(%))	29	70.7	21	51.2	3.28	0.07
Father's education (more than high school n(%))	32	78.0	31	75.6	0.69	0.79
Income (more than minimum wage n(%))	24	58.5	21	51.2	0.44	0.51
Delivery (C/S n(%))	25	61.0	22	53.7	0.45	0.50
Time of Delivery (term (38-42 weeks), n(%))	36	87.8	37	90.2	0.13	0.72
Number of children (median(IQR))	2 (1-2)		3 (2-3)		4.38*	<0.001
Breastfeeding duration (months, mean±SD)	13.80±6.75		18.02±7.25		2.73	0.008

Abbreviations: M: male, F: female, IQR: interquartile range, SD: Standard Deviation, C/S: Caesarean section, Mann-Whitney U test.

emotional (positive reframing, venting, acceptance, emotional support, and humor); and avoidant emotional coping (denial, self-distraction, self-blame, behavioral disengagement, and substance use) [22]. Higher scores indicate that the individual uses this coping style more frequently. The Cronbach alpha value in Turkish adaptation study was 0.79 [23].

Statistical analysis

All analyzes were performed via SPSS 28 (IBM, Armonk, NY, USA). Normality of data was determined by Kolmogorov-Smirnov test. The primary outcome variables were depression and anxiety levels and coping strategies. The hypotheses of the study were tested with Student's t test or Mann Whitney U test. Quantitative data were summarized as mean ± standard deviation and N (%). Categorical variables were analyzed with chi-square test. Continuous variables were compared between the two groups with student's t test or Mann-Whitney U test depending on if they were normally distributed or not, respectively. Correlations between variables were analyzed with the Spearman or Pearson correlation test. P values less than 0.05 were considered statistically significant.

Results

The two groups were not significantly different from each other in terms of children's age and sex. Most of the other sociodemographic variables were not different between the groups. Mothers in the control group had more children than mothers in the CMPA group. Total breastfeeding duration was significantly lower in the CMPA group (Table 1 and Table 2).

Depression and anxiety scores were significantly higher in the CMPA group according to the Beck depression and anxiety scales. The mothers in CMPA group had significantly more moderate to severe anxiety and depression than mothers in the control group (Table 3).

The mothers in the CMPA group used problem focused coping strategies significantly less than the control group. Specifically, the mothers in CMPA group used positive reinterpretation and growth, active coping, suppression of competing activities and planning less than control group;

Table 2. Clinical characteristics of children with CMPA.

Variables		
Age at first symptom onset (months, mean± SD)	4.3±2.2	
Follow-up period (months, mean±SD)	10.8±5.6	
The age of starting supplementary food (mean±SD)	5.3±0.9	
First symptom of CMPA	Hematochezia	26 (63.5%)
	Diarrhea	11 (26.9%)
	Vomiting	8 (19.5%)
Dermatological signs (%)	18 (56.1%)	
Food allergy other than CMPA (%)	12 (29.3%)	
Atopia in the family (%)	11 (26.8%)	

Abbreviations: SD: Standard Deviation.

Table 3. Comparison of anxiety, depression between patient and control group.

Variables	Patient	Control	t or x ²	p
Anxiety (mean± SD)	16.17±8.85	5.49±5.79	6.47	<0.001
Depression (mean± SD)	13.17±7.46	5.83±5.96	4.92	<0.001
Moderate/ severe depression n(%)	13 (31.7%)	4 (9.8%)	6.01	0.014
Moderate/ severe anxiety n(%)	21 (51.2%)	4 (9.8%)	16.63	<0.001

Abbreviations: SD: Standard Deviation.

behavioral disengagement more than control group (Table 4).

There was a significant correlation between anxiety and depression levels (r=0.55, p<0.001). On the other hand, no significant relationship was found between anxiety and coping scores; depression and coping scores in both groups. Additionally, mothers who have moderate to severe anxiety in the CMPA group used denial (z=2.1, p=0.036) and humor (z=1.99, p=0.047) less than mother with mild to subthreshold anxiety. A negative correlation was detected between active emotional coping scores and time of adding supplemental food to infant's diet (r=-0.42, p=0.06). Children who had additional food allergies breastfed less than the children who had only CMPA (z=-2.33, p=0.02).

Table 4. Comparison of coping attitudes of parents between patient and control group.

Variables	Group	N	Mean	SD	t	p
Positive Reinterpretation and Growth	Patient	41	12.29	3.30	-2.42	0.009
	Control	41	13.76	2.02		
Mental Disengagement	Patient	41	9.34	2.77	-1.20	0.12
	Control	41	10.07	2.76		
Focus On and Venting of Emotions	Patient	41	11.05	3.07	0.12	0.45
	Control	41	10.98	2.51		
Seeking Social Support-Instrumental	Patient	41	11.32	3.54	-0.61	0.27
	Control	41	11.73	2.48		
Active Coping	Patient	41	11.29	2.90	-2.13	0.018
	Control	41	12.61	2.70		
Denial	Patient	41	7.27	2.76	-0.17	0.43
	Control	41	7.37	2.57		
Turning To Religion	Patient	41	14.24	2.99	0.43	0.34
	Control	41	14.00	2.09		
Humour	Patient	41	8.00	3.87	1.14	0.13
	Control	41	7.17	2.59		
Behavioral Disengagement	Patient	41	7.59	2.77	2.07	0.021
	Control	41	6.44	2.23		
Restraint Coping	Patient	41	9.56	2.29	-1.33	0.094
	Control	41	10.22	2.21		
Seeking Social Support-Emotional	Patient	41	11.46	2.92	-0.25	0.40
	Control	41	11.61	2.37		
Alcohol-drug Disengagement	Patient	41	5.27	2.99	0.68	0.25
	Control	41	4.88	2.11		
Acceptance	Patient	41	10.24	2.79	1.37	0.088
	Control	41	9.46	2.37		
Suppression of Competing Activities	Patient	41	10.15	1.93	-1.71	0.045
	Control	41	10.93	2.18		
Planning	Patient	41	11.56	2.89	-2.08	0.021
	Control	41	12.83	2.63		
Problem-Focused Coping	Patient	41	53.88	9.53	-2.35	0.021
	Control	41	58.37	7.65		
Active Emotional Coping	Patient	41	67.29	11.75	0.15	0.88
	Control	41	66.98	7.31		
Avoidant Emotional Coping	Patient	41	29.46	7.43	0.32	0.64
	Control	41	28.76	6.07		

Abbreviations: SD: Standard Deviation.

Discussion

This study showed that mothers of youngsters with CMPA had higher anxiety and depression scores than mothers of the control group. In addition, it was observed that they used various coping styles significantly more or less compared to the mothers in the control group, however, there was no significant relationship between coping styles and anxiety and depression scores. This is the first study to investigate depression and anxiety levels and coping styles in mothers of children with CMPA.

In the present study, maternal anxiety scores were signif-

icantly higher in CMPA group. As far as we know, there is only one study which has reported significantly higher levels of state and trait anxiety in mothers of infants diagnosed with CMPA. The authors reported that the highest anxiety levels were found in mothers whose children presented with respiration problems and hematochezia [5]. There are several studies that report higher levels of anxiety in parents of children with food allergies [6]. Various food allergy symptoms such as food anaphylaxis, respiratory problems have been shown to be associated with increased anxiety in parents [24]. Contrary to other studies in the literature, we have not found any significant relationship between anxiety levels and CMPA symptoms in this study. The reason for this may be that the children in our study were young and did not show severe CMPA symptoms (anaphylaxis and respiratory problems etc.).

The parents of children with CMPA had higher depression scores. To our knowledge, no study has investigated the levels of depression in caregivers of youth with CMPA. On the other hand, there are several studies investigating depression levels in parents of children with food allergies. In these studies, there are those who report high levels of depression [8], and there are also studies that do not find a significant difference with the control group [25]. It has been shown that the younger age of the child increases parental stress in children with food allergies. As a significant proportion of the sample of the current study was less than one-year old, higher depression scores in their parents can be expected [6]. Although there was no association between the child's age, CMPA symptoms, parent education and income, and depression scores, which were shown as risk factors in the literature [6], approximately one-third of parents in this study reported moderate to severe depression. More studies are needed to examine the risk factors related with depression in caregivers of youth with CMPA.

Food allergies place an important burden on family life, for instance more careful preparation of meals and restriction of social life [11]. For this reason, coping styles are important in order to manage these difficulties in a healthy way. In this study, the parents of subjects with CMPA used problem-focused coping strategies significantly less than the control group. Problem-focused coping strategies have been shown to be related with healthier psychological functioning in parents of children with chronic health problems [16]. Interestingly, there was no significant relationship between coping scores and anxiety and depression. Therefore, coping strategies may indirectly affect psychological well-being. More longitudinal research is needed to enlighten the pathway between coping strategies and psychological well-being in parents of CMPA.

Parents of children with CMPA may behave differently from parents of healthy children in terms of the physical and psychological aspects of parenting [12]. Especially gastrointestinal symptoms (colic, etc.) seen in infants with CMPA may affect the sleep of the baby and make parenting difficult [26]. Mothers of children with CMPA need to adapt to a dairy-free diet if they are breastfeeding. Therefore, mothers of children with CMPA may stop breastfeeding earlier than mothers of healthy children. In this study, children with CMPA were breast-

fed for a significantly shorter time than children in the control group. In addition, children with multiple food allergies stopped breastfeeding earlier than children with CMPA only. However, in the present study, no relationship was found between breastfeeding duration and the mother's coping strategies and depression or anxiety levels. These results are not surprising considering that many factors such as the difficulties experienced by the mother in compliance with the diet and the problems of the baby with CMPA can affect the duration of breastfeeding in a complex way. More detailed and well-designed studies are needed on factors associated with breastfeeding in children with CMPA.

This study has several limitations that should be considered when interpreting the results. First of all, the cross-sectional design of the study prevents reaching the cause-effect relationship. Second, psychological problems were evaluated with self-rating scales, future research may use psychiatric examination to assess anxiety and depression. Third, the small sample size of the study reduces the generalizability of the results. Besides these limitations, this study is the first to evaluate anxiety, depression and coping styles in a sample of mothers of children with CMPA.

Conclusion

In conclusion, caregivers of children with CMPA are at high risk for anxiety and depression, as CMPA symptoms can be frightening and it is difficult to adapt to a dairy-free diet. Mothers of children with CMPA may be at risk of premature cessation of breastfeeding. Clinicians should inform mothers about the benefits of breastfeeding. Clinicians should refer mothers who experience anxiety and depression due to the stress of being the mother of a child with CMPA to seek psychological support.

Ethical approval

Ethics Committee approval was obtained from Adiyaman University Ethics Committee (Approval Date: January 22, 2019; Approval Number: 2019/1-3).

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