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COGNITIVE VULNERABILITY FOR POSTPARTUM DEPRESSION: IMPLICATIONS FOR INTERVENTION

PhD Thesis Abstract

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INTRODUCTION

Depression is among of the main causes of functional impairment and suffering, both in developed countries and in developing ones (World Health Organization, 2008a). The diagnosis of major depression is three times more prevalent in women compared to men (American Psychiatric Association, 2013). In addition, the disabling burden of depression is 50% higher in women compared to men (WHO, 2008b). World Health Organization predicts that by 2020, one in four women will suffer from a lifetime affective disorder (WHO, 1997). Women at childbearing age (15-44 years) have an increased vulnerability for affective disorders (Abel & Kulkarni, 2006) due to specific hormonal changes (e.g. perinatal) and exposure to psychosocial stressors.

The postpartum timeframe is recognized as presenting a risk for the onset of affective disorders (Robertson, Celasun & Stewart, 2003; Jones & Venis, 2001). Apparently, 7-13% of mothers develop depression during the first year following childbirth (O'Hara & Swain, 1996) and up to 20% in the first three months postpartum (Gavin et al., 2005). Although this rate is similar to that of general depression in women, postpartum depression is considered a public health problem due to its consequences not only on the woman, but also on child development. Postpartum depression or postnatal depression are both used in literature with reference to depressive symptomatology with onset following childbirth.

1.1. Postpartum depression: current status

1.1.1. Definition

The term postpartum depression is generally used in literature for depressive symptomatology with postpartum onset which is etiologically related to childbirth or to specific physiological/hormonal, social, psychological or environmental factors occurring in temporal proximity to childbirth (O'Hara & Gorman, 2004). There is a great variability in research and in clinical practice in defining depressive symptomatology and delimitating the postpartum period.

Broadly, postpartum depression denotes a non-psychotic mild or moderate depressive episode, including subclinical depressive symptoms, with onset in the first year following childbirth (Scottish Intercollegiate Guidelines Network, 2002). Narrow, postpartum depression refers to a major depressive episode beginning in the first 4 weeks after childbirth (American Psychiatric Association, 2000). In research, the definition of postpartum depression lies on a continuum between these two limits.

1.1.2. Concept development
Pitt (1968) is among the firsts in literature to describe an atypical puerperal depression with a different clinical presentation than general depression. In the 80's postnatal depression in British literature and postpartum depression in the American one are commonly found. The last decade witnesses a significant increase in clinical and research interest for postpartum depression. Research into postpartum depression mirrored the research into general depression, remaining however one step behind. As a distinctive feature of postpartum depression

compared to depression unrelated to childbirth, biological mechanisms have been given an increased attention in postpartum depression. Currently, the main research themes in postpartum depression literature are the consequences of postpartum depression on child development, risk factors and effectiveness of interventions.

1.1.3. Concept delimitation

The postnatal affective disorders spectrum comprises depressive symptomatology ranging in intensity from baby blues/maternity blues, to postpartum depression and puerperal/ postpartum psychosis.

Baby blues (postpartum/postnatal/maternity blues) are a transient condition starting in the first two weeks following childbirth in 50-85% of women (Jones & Joyce, 2001). Characteristic symptoms are mood swings, crying, anxiety, sadness, insomnia, fatigue (Epperson & Ballew, 2006). This may take from a few hours to a few days, it does not impair functioning and requires no treatment. Symptoms of postpartum blues are largely attributed to hormonal and biological factors (Robertson et al., 2003).

Postpartum psychosis is a severe disorder, but with a low incidence (0.1 - 0.2%). It has an acute onset within the first 3-4 weeks after birth, after an asymptomatic period. Signs include severe affective symptoms and psychotic features such as: hopelessness, restlessness, insomnia, disorientation, auditory and visual hallucinations, suicidal thoughts or of harming the child (Epperson & Ballew, 2006). Biological mechanisms are involved in the onset and the development of the disorder (Robertson et al., 2003).

Postpartum depression has an onset between 1-12 months following childbirth. A postpartum depressive episode has the characteristics of a depressive episode that occurs in any other time of life, but usually anxiety is higher in postpartum episodes. Common symptoms of depressive episodes include feelings of loneliness, irritability, loss of self, fear of going mad (Epperson & Ballew, 2006). The distinctive content features of the postpartum depressive episode include feelings of guilt and inadequacy to the mother role (Beck, 2002), the feeling of inability to properly take care of the baby and exaggerated concerns about the child's health (Robinson & Steward , 2001). Women with postpartum depression perceive themselves as bad mothers, incapable and unloving (Robinson & Stewart, 2001). Wisner, Moses-Kolko & Sit (2010) present several developmental pathways for postpartum depression. In some cases, postpartum blues continue, increase and turn into postpartum depression. In other cases, a period of feeling good after childbirth is followed by a decline or a gradual onset of depression. Sometimes, the symptoms start prenatally and are increased postpartum. Also, an episode of postpartum depression can occur amid a preexisting dysthymic or anxiety disorder. There is a great variability in research and in clinical practice in defining the depressive symptomatology and in the temporal delimitation postpartum period.

1.1.4. Diferential diagnosis

Currently, postpartum depression is not a distinct nosological category in the two major classification systems (ICD, WHO, DSM, APA). Postnatal depressive symptoms are classified in DSM (APA, 2000; APA, 2013) and ICD (WHO, 1993; WHO, 2007) as part of the spectrum of affective disorders. The two classification systems offer similar criteria for the diagnosis of major depression.

ICD-10 (WHO, 1993; WHO, 2007) recommends that postpartum depressive symptoms are be assigned to the category of depressive symptoms nonrelated to childbirth. If symptoms do not allow classification in an affective disorders category, but begin in the first 6 weeks postpartum, are to be classified in mild behavioural disorders associated with the puerperal period, no otherwise classified.

For depressive symptomatology in the postnatal period, DSM-IV-TR (APA, 2000) uses the specifier "postpartum onset" that can be applied to a current major depressive episode (or the most recent) if the onset occurs within 4 weeks after the childbirth. DSM-5 (APA, 2013) modified the "postpartum onset" specifier to "with peripartum onset", maintaining the temporal criteria.

In literature and in clinical practice, the term postpartum depression is used to describe all symptoms of depression during the postpartum, disregarding if they have a postnatal onset or are preexisting conditions. Therefore postpartum depression covers the whole spectrum of depressive symptoms in the postpartum period. But the postpartum depression label applied to high levels of depressive symptomatology in the postnatal period includes a number of distinct diagnostics from the spectrum of depressive adaptation-related disorders. Postpartum depression comprises the following DSM-5 diagnostics (APA, 2013): major depressive disorder, brief depressive episode, brief recurrent depression, persistent depressive disorder (dysthymia), insufficient depressive episode symptoms and adjustment disorder with depressed mood. Postpartum depression comprises the following ICD-10 diagnoses (WHO, 1993; WHO, 2007): depressive episode, recurrent depressive disorder, recurrent brief depressive episode, dysthymia, adjustment disorder: brief depressive reaction (one month) or prolonged (2 years).

The scientific position of postpartum depression as a distinct nosological category is currently under discussion (Wisner et al., 2010; Austin, 2010; Jones & Cantwell, 2010; Riecher-Rossler & Hofecker-Fallahpour, 2003).

1.1.4. Evaluation
In research and in clinical practice are used to assess perinatal depressive symptoms both specific tools such as the Edinburgh Postnatal Depression Scale (Edinburgh Postnatal Depression Scale, EPDS; Cox, Holden & Sagovskzy, 1987) and general instruments such as the Beck Depression Inventory (Beck depression Inventory, BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961) or the Center for epidemiologic studies depression the Scale (CES-D; Radloff, 1977).

1.1.5. Prevalence of postpartum depression
Estimated prevalence rates of postpartum depression varies between 5 and 25%, depending on the population, the assessment method and timeframe criteria used for onset (Gaynes et al., 2005).

In 2008, WHO drew attention to the fact that perinatal mental health problems have been studied in more than 90% of developed countries, while available information for undeveloped countries and developing ones are limited (WHO, 2008a). For Romania, Wallis et al. (2012) recently reported 32% (CES-D) and 38% (EPDS-R) prevalence rates for depressive symptoms in the last trimester of pregnancy. Prenatal depression is recognized as one of the strongest predictors of postpartum depression and prenatal depressive symptoms seem to be as common as postpartum depressive symptoms (Milgrom et al., 2008). In comparison, in Australia, only 8.9% of the 40,000 participants had a prenatal EPDS score over 12 and 15.7% had a postnatal EPDS score over 9 (Buist et al., 2007). The prevalence of postpartum depression reported using EPDS has a great cross-cultural variance (Halbreich & Karkun, 2006): 5% in Austria, 5.5% in Danamarca, 8.5% in France, 12.8% in UK, 17.1% in Germany, 17.4% in Spain, 22.5% in Ireland, 29.8% in Turkey, 38.1% in Italy, 15.4% in the United States. These rates are influenced by the temporal criteria chosen, the socio-economic and cultural diversity.

1.2. Consequences of postpartum depression
Postpartum depression has negative consequences not only on the mother, but also on her relationship with the child and on child development (Philipps & O'Hara, 1991; Burke, 2003),

it affects the couple relationship and interpersonal relationships in general (Burke, 2003). A number of literature analyses have synthesized the literature on the consequences of maternal depression on children (Grace & Sansom, 2003; Grace, Evindar & Stewart, 2003; Field, 2011; Goodman & Santangelo, 2011).

Figure 1 presents a theoretical model explaining the influence of maternal postpartum depression on child development. It was built on models previously described in the literature by Cummings & Davies (1994), Goodman & Gotlib (1999) and Elgar, McGrath, Waschbusch, Steward & Curtis (2004) and integrates the latest research results.
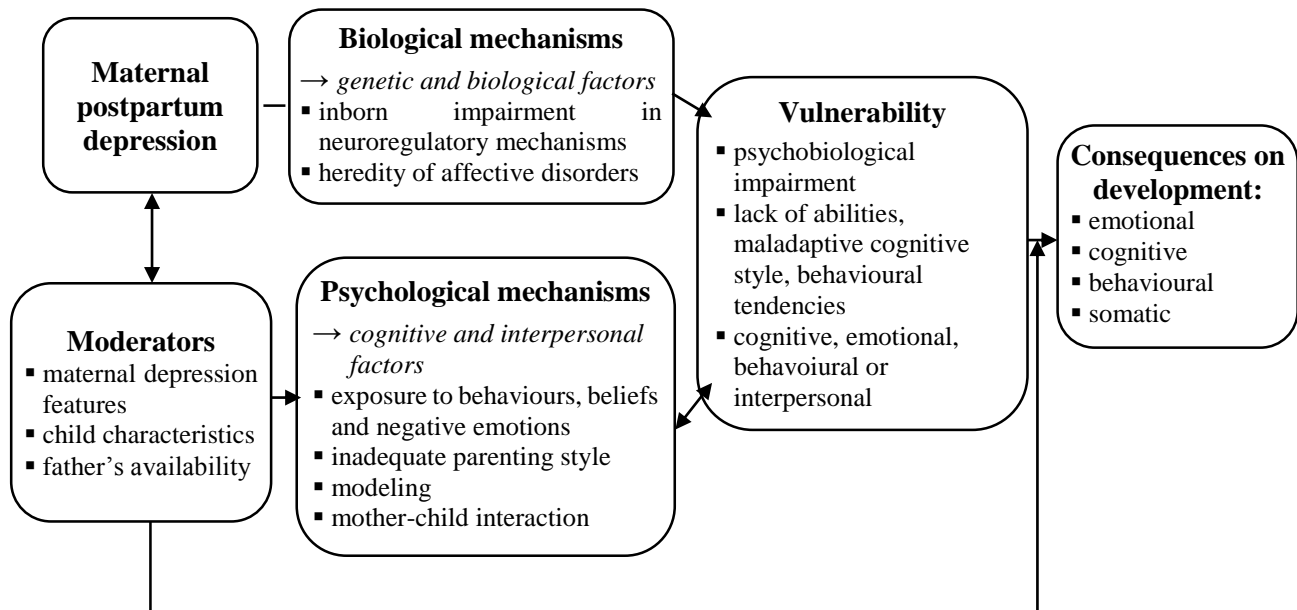
Figure 1 A theoretical model explaining the influence of maternal postpartum depression on child development (apud. Cummings & Davies, 1994, Goodman & Gotlib, 1999, Elgar, McGrath, Waschbusch, Steward & Curtis, 2004)

1.3. Risk factors for postpartum depression

A number of biological, psychological and social factors were analysed as potential predictors for postpartum depression. A review of the literature has identified three meta-analyses on risk factors for postpartum depression (Robertson et al., 2003; O'Hara & Swain, 1996; Beck, 2001). In addition, Robertson, Grace, Wallington & Steward (2004) made an analysis on prenatal risk factors for postpartum depression.

The analysis conducted by Robertson et al. (2003) includes the results of two previous analyses (O'Hara & Swain, 1996; Beck, 2001) and classified the risk factors according to their size effect. Risk factors with large/moderate size effect are: depression/anxiety in pregnancy, previous history of depression, stressful life events and low social support. Risk factors with moderate effect are difficult temperament of the child, an increased level of stress related to child care, neuroticism, low self-esteem, marital relationship. Risk factors with low effect size are pregnancy and obstetric complications, attributional style, socio-economic status. Sociodemographic factors with no significant effect are: maternal age, educational level, parity (primiparous/multiparous), child gender, ethnicity.

1.3.1. Biological factors

One of the distinguishing features of childbirth is that it is accompanied by a dramatic decrease in the level of steroid hormones such as estradiol, progesterone and cotrisol (Bloch et al., 2000; Bloch et al., 2005a). Disparate studies on the influence of hormones on perinatal mood can be attributed to two major theories: the theory of decreased hormonal levels and the theory of disturbance in the HPA axis (hypothalamic-pituitary-adrenal).

The theory of decreased hormonal levels assumes that the drop in estradiol and progesterone causes proximal postpartum depression and postpartum blues in vulnerable women (O'Hara, Schlechte, Lewis, & Varner, 1991; Workman, Barham & Galea, 2012). However, it seems that there are no differences between women with postnatal depression postnatal depression and those without in terms of estrogen, progesterone or cortisol levels (Bloch, Daly & Rubinow, 2003; Workman et al., 2012).

More data argue that abnormalities in the HPA axis activity plays an important role both in depression and in postpartum depression (Meltzer-Brody, 2011). The inferred mechanism is that estrogen and progesterone significantly interacts with the HPA axis functioning and can trigger abnormal activity in vulnerable women. Bloch et al. (2000) demonstrated that women with postpartum depression, although having normal levels of reproductive hormones, have an atypical response to changes in levels of estrogen and progesterone. There seems to be a subset of women who have a different sensitivity to reproductive hormones and that in this subgroup normal endocrine changes related to childbirth can trigger an affective episode. Unlike decreased hormonal levels theory, this biological theory is congruent with a number of other data.

First, the spectrum of affective disorders in the perinatal period indicates an apparent vulnerability in some women to changes in gonadal steroid levels both during pregnancy and after childbirth. Then, there is the relationship between postpartum depression and premenstrual dysphoric syndrome (Klatzkin, Lindgren, Forneris, & Girdler, 2010; Haywood, Slade, & King, 2007; Bloch, Rotenberg Korenc, & Klein, 2005), recent studies (Buttner et al ., 2013) indicating that even premenstrual dysphoric syndrome is a risk factor for postpartum major depressive disorder. Finally, Cooper & Murray (1995) concluded, after a longitudinal study that there is a subgroup of women for whom the puerperal period presents an increased risk for postpartum depression, and this risk may be biological or psychological.

1.3.2. Psychological factors: cognitive vulnerability

The results of meta-analyses (Robertson et al., 2003; Beck, 2001; O'Hara & Swain, 1996) on risk factors for postpartum depression indicate as the strongest risk factors for postpartum depression: depression or anxiety in pregnancy, a personal history of depressive episode and low social support. In contrast, cognitive vulnerability factors investigated (attributional style) have little effect.

Cognitive vulnerability to postpartum depression is supported indirectly by the extensive literature on cognitive vulnerability to general depression. Thus, if the personal history of depression is the strongest predictor of postpartum depression and cognitive vulnerability participated to the onset and development of a prior depressive episode, then this vulnerability will favour the onset of a new depressive episode with postpartum onset this time. So if this vulnerability exists and is inactive prenatally, it can still be evaluated and will predict postnatal symptoms. In addition, this vulnerability will be involved in prenatal depressive symptoms.

1.4. Postpartum depression: future directions

The scientific status of postpartum depression as a distinct nosological category is debatable, and the usefulness of the term postpartum depression is called into question in the recent years (Wisner et al., 2010; Austin, 2010; Jones & Cantwell, 2010; Riecher-Rossler &

Hofecker -Fallahpour, 2003). However, the literature (ex. Cooper & Murray, 1995; Bloch et al., 2000) suggests that childbirth can act as a specific triggering event for depressive episodes in some women, and that a subgroup of women with major depression are vulnerable to a postpartum biological or psychosocial trigger.

The data on the contribution of psychological factors in the onset and maintenance of postpartum depression are far from exhaustive. The hypothesis that cognitive factors may have an important role in the etiology of postpartum depression is theoretically supported by the cognitive models of general depression. Considering cognitive models of depression are strongly supported empirically, testing them in relation to postpartum depression research is a viable direction.

There are a number of open questions in the literature on cognitive vulnerability to postpartum depression:

Q1: What are the cognitive vulnerability factors contributing to the development and maintenance of postpartum depression?

Q2: How do depressive symptoms develop in the perinatal period in relation to cognitive vulnerability?

Q3: Is there a general cognitive vulnerability for postpartum depression and/or a motherhood-specific one?

Q4: Do cognitive vulnerability factors interact with perceived social support in developing postpartum depression?

Q5: What is the effect of a cognitive-behavioural intervention targeting cognitive vulnerability factors (dysfunctional attitudes and automatic thoughts) on postpartum depressive symptoms?

These open questions identified in the literature on postpartum depression led to the formulation of objectives and the methodology of the present research.

CHAPTER II
Research objectives

After analysing the literature presented in the introductory chapter, we identified two major areas of research: (1) investigating cognitive factors with an etiopathogenetic role on postpartum depression and (2) developing an intervention program targeting cognitive factors and determining the effect of this cognitive behavioural intervention on postpartum depressive symptomatology. The following theoretical premises contributed to establishing research directions:

1. Data on the contribution of psychological factors in the onset and maintenance of postpartum depression are far from exhaustive, and the hypothesis that cognitive factors may have an important role in the etiology of postpartum depression research is a viable research direction.

2. Childbirth can act as a specific triggering event for depressive episodes in some women; a subset of women with major depression are vulnerable to a postpartum biological or psychosocial trigger.

3. The postpartum is a unique timeframe for women in terms of neuroendocrine changes and stress on the psychological coping mechanisms. Changes in lifestyle associated with the postnatal period (childcare, a drastic change in the daily schedule, lack of sleep, daily routine, isolation) can become stressors and can affect the mother's mood.

4. Postpartum depression is associated with several negative consequences not only on the mother but also on child development, the couple relationship and interpersonal relationships in general.

The research directions and questions derived from the literature review have defined the objectives and methodology of the present research.

Objective 1: literature analysis on cognitive vulnerability for postpartum depression

In Study 1, the literature on cognitive vulnerability to postpartum depression was analysed. The data was structured based on the cognitive theories investigated and on the evaluation instruments used. The aim of this study was to provide a preliminary response to the question: what are the cognitive vulnerability factors contributing to the development and maintenance of postpartum depression? The systematic literature analysis showed the following: (1) dysfunctional attitudes and attributional style are the cognitive vulnerability factors investigated in relation to postpartum depression, (2) setting as a future research direction to test dysfunctional attitudes to the expense of the attributional style, (3) the need of an instrument for the evaluation perinatal dysfunctional beliefs developed based on a theoretical model, (4) the role of longitudinal studies in investigating the role of cognitive vulnerability to postpartum depression. These conclusions have guided the development of the following studies and the methodology review.

Objective 2: investigating the relation between cognitive vulnerability and the development of depressive symptoms in the perinatal period.

In Study 2 cognitive vulnerability factors (dysfunctional attitudes and automatic thoughts) were tested in relation to postpartum depression. The longitudinal design study (pre/postnatal) allowed to establish the temporal precedence of the cognitive vulnerability factor and its existence independently of the symptoms level. This study aimed to answer the question: how do depressive symptoms develop in the perinatal period in relation to cognitive vulnerability?

Objective 3: investigating general and specific cognitive vulnerability and the interaction between cognitive vulnerability factors and social support in developing postpartum depressive symptomatology.

Study 3 expands the testing of cognitive vulnerability factors in relation to postpartum depression by investigating the relationship between postpartum depression and cognitive processes and the one between types of irrational beliefs and types of social support in the development of postnatal depressive symptoms. Also, the study aims to overcome methodological limitations identified in Study 1, through the development and preliminary validation of an instrument designed to assess postpartum dysfunctional beliefs based on a theoretical model. The role of Study 3 was to answer two questions: how do cognitive vulnerability factors interact with perceived social support in developing postpartum depression?, namely: is there a general cognitive vulnerability for postpartum depression and/or a motherhood specific one?

Objective 4: determining the effect of cognitive behavioural intervention on postpartum depressive symptomatology

Study 4 sought to develop an intervention program targeting cognitive factors for postpartum depression and to determine the effect of a cognitive behavioural intervention on postpartum depressive symptoms. It answers the question: what is the effect of cognitive-behavioural interventions targeting cognitive vulnerability factors (dysfunctional attitudes and automatic thoughts) on postpartum depressive symptoms?

Chapter III
Study 1. Cognitive vulnerability for postpartum depression: a systematic literature review[1]

3.1. Introduction

The investigation of cognitive vulnerability to postpartum depression appears to be a more recent approach in literature, but similar to the exploration of cognitive variables in relation to general depression. Although the relationship between the cognitive style and the vulnerability to depression is strongly validated in literature, the investigation of the relationship between cognitive style and postpartum depression has not produced similar results yet. Two cognitive theories contributed to the understanding of the etiology of general depression (Alloy & Abramson, 1999): Beck's theory (1967) and the theory of hopelessness (Abramson et al., 1989).

Cognitive vulnerability refers to cognitive features (such as maladaptive beliefs, attributional styles, cognitive processes, schemes) that increase the likelihood of developing a disorder. These cognitive vulnerabilities exist long before the onset of first signs or symptoms of the disorder. At the intersection with stressful life events, they create vulnerability to specific psychological disorders, develop and maintain problems after their onset. The core of stress-vulnerability models for depression is the idea that negative life events can interact with a pre-existing personal vulnerability for depression.

The two theories of depression, hopelessness theory (Abramson et al., 1989) and Beck's theory (1967), are stress-vulnerability models in which the variance in susceptibility to depression after a stressful life event is understood in terms of differences in cognitive styles that affect the way the event is interpreted. These two psychological models of depression involve a cognitive vulnerability represented by negative self-schemas (Beck, 1967) or a dysfunctional attributional style (Abramson et al., 1989).

This study presents a systematic literature review on cognitive vulnerability to postpartum depression, followed by an analysis of cognitive vulnerability assessment instruments. The objectives of the study are: (1) to review the literature on cognitive vulnerability for postpartum depression and to identify the extent to which each cognitive theory is represented in the literature on postpartum depression, (2) to analyse the strengths and weaknesses of the instruments used to assess cognitive vulnerability.

3.2. Method

A computerised literature search was conducted, including articles indexed in PsychInfo, Proquest, ScienceDirect and Medline. As search keywords were used: "postpartum depression" or "postnatal depression" and combinations of the terms "cognitive vulnerability", "attitudes", "beliefs" and "dysfunctional". The search included articles published until January 2012.

Inclusion criteria were: (1) Article published in English, (2) has as theme postpartum depression, (3) evaluates cognitive vulnerability. Exclusion criteria were: (1) investigation of postpartum depression or cognitive vulnerability in specific populations (eg. teen mothers, mothers with premature babies or perinatal death of the baby) or in populations with comorbid disorders (mothers with eating disorders, bipolar disorder or depression with psychotic features), (2) study that has as objective validation of an instrument.

The literature on postpartum depression is heterogeneous, the phenomenon being investigated not only from a psychological perspective, but also from a medical one. A general

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[1] Madar, A. (2013). Evaluarea vulnerabilității cognitive pentru depresia postpartum: o analiză sistematică. In Milcu, M. (Ed.) *Cercetarea aplicativă în psihologia modernă: premise metodologice* (48-58). București: Ed. Universitară.

definition of cognitive vulnerability was used in order to be include the studies in other domains that have investigated the beliefs and attitudes postnatal period. Thus, cognitive vulnerability was defined as those cognitive features (such as maladaptive beliefs, attributional styles, cognitive processes, schema) which, at the intersection with stressful life events, increase the likelihood of developing specific psychological disorders, develop and maintain problems after their onset.

The initial search based on keywords led to 6652 articles that were analysed based on their abstracts. After applying the pre-established criteria for inclusion and exclusion, 10 articles resulted and for them it was obtained the full text.

3.3. Conclusions

3.3.1. Cognitive vulnerability for postpartum depression

Two cognitive constructs were tested in relation to postpartum depression: dysfunctional attitudes (Beck's cognitive model of depression, Beck, 1967) and attributional style (reformulated model of learned helplessness, Abramson, Seligman, & Teasdale, 1978, hopelessness theory, Abramson, Metalsky & Alloy, 1989). Early studies found promising results for the attributional style (O'Hara, Rehm, & Campbell, 1982; Cutrone, 1983), while the dysfunctional attitudes seemed not to contribute significantly (O'Hara et al., 1982; Gotlib, Whiffen, Wallance, & Mount, 1991). However, recent studies do not reply the results for the attributional style (O'Hara, Neunaber, & Zekoski, 1984; Grazioli & Terry, 2000) and provide evidence for the dysfunctional attitudes as predictors for postpartum depression (Grazioli & Terry, 2000; Church, Dunstan , Hine, & Marks, 2009; Phillips, Sharp, Matthey, & Charles, 2010).

The two theories of depression are equally represented in the studies reviewed, although previously Swendsen & Mazure (2000) concluded that the hopelessness theory (Abramson et al., 1989) was the most investigated stress-vulnerability theory in relation to depression postpartum. Swendsen & Mazure (2000) also emphasized that, despite the attention given to this concept, the attributional style has not received empirical support as a consistent predictor for postpartum depression. Indeed, the conclusion of Swendsen & Mazure (2000) is also confirmed here.

This literature review confirms the importance of longitudinal or prospective design studies as a way to test cognitive vulnerability factors, as they allow determination of both the temporal precedence of cognitive vulnerability factor and its independence of the symptoms. It also allows observation of high risk participants who have not yet developed the disorder.

Only recent studies (Church et al., 2009; Phillips et al., 2010) have considered the hypothesis of postpartum depression subtypes. Even if data are not conclusive, this line of research is a viable direction.

A major limit of the studies analysed is the unclear definition of the stressor in the stress-vulnerability models hypothesized and tested. Usually, it is considered that the perinatal period, with its specific changes, is a stressor by itself (pregnancy, childbirth, postpartum period, adapting to the mother role).

3.3.2. Evaluation of cognitive vulnerability for postpartum depression

In the studies reviewed, three categories of cognitive vulnerability assessment instruments are found. On the one hand, there are the specific cognitive vulnerability instruments, and on the other there are two categories of general cognitive vulnerability instruments (attributional style evaluation and assessment of dysfunctional attitudes), according to the two major theories in literature in relation to depression (Beck, 1967; Abramson, Seligman, & Teasdale, 1978; Abramson, Metalsky & Alloy, 1989).

The *Maternal Attitudes Questionnaire* (MAQ, Warner, Appleby, Whitton, & Faragher, 1997) is an instrument assessing motherhood beliefs as specific cognitive vulnerability for postpartum depression. MAQ's strengths are on the one hand, good psychometric properties: increased reliability (test-retest and internal consistency), concurrent and aspect validity. On the other hand, it has reduced administration time, relevance to postpartum period and thematic congruity with the specific beliefs in postpartum depression which increase its practical usefulness in intervention. The weaknesses of MAQ are: it cannot be used prenatally, but could be adapted to prospectively investigate prenatal predictors of postpartum depression beliefs; items are derived from practical experience and from subscales of earlier instruments for beliefs related motherhood; conceptually, items evaluate dysfunctional beliefs, attitudes and expectations, but with no theoretical framework.

The *Dysfunctional Attitudes Scale* (DAS, Weissman, 1979; Weissman & Beck, 1978) is a self-assessment instrument for attitudes associated with depressive symptoms. It was built to assess cognitive contents underlying depressive symptoms according to Beck's Theory (Beck, 1967). DAS's strengths are good psychometric properties, high correlations, validated in numerous studies, with depression (eg. Oliver, Murphy, Ferland, & Ross, 2007; Macavei, 2006) and that is built within a theoretical model of depression. The main weakness is its specificity: the incongruity with the specific themes of perinatal beliefs. The practical utility in intervention may be impared, and also its predictive and explanatory power for postnatal depression.

The *Attributional Style Questionnaire* (ASQ, Peterson et al., 1982) is an instrument developed to measure attributional constructs relevant to attributional theories of depression. ASQ weaknesses are moderate internal consistency and low aspect validity: using hypothetical situations to the detriment of real, persoanl events. A strength of the ASQ compared to MAQ is the theoretical model of depression it is built in.

Real Events Attributionl Style Questionnaire (REASQ, Norman & Antaki, 1988) was developed as an alternative to ASQ, aiming to remedy its deficiencies (moderate internal consistency and low face validity). The weakness of REASQ, as well as the ASQ, is moderate internal consistency, but the advantage of REASQ compared to ASQ and DAS is face validity; compared to MAQ, REASQ is developed within a theoretical model of depression.

There were identified a number of strengths and weaknesses of the instruments used in the analyzed studies. Instruments used to assess general cognitive vulnerability to depression postpartum lack relevance to the perinatal context and thematic congruence with perinatal specific beliefs. These limits could impair their predictive and explanatory ability for postnatal depressive symptoms. And the only instrument assessing motherhood specific beliefs and attitudes used in the studies reviewed, is not developed within a theoretical model. Having identified this methodological gap, Moorhead, Owens and Scott (2003) developed an instrument for dysfunctional beliefs related to pregnancy. The questionnaire, however, requires refining, factor analysis and validation on a larger sample.

Regarding the assessment of specific cognitive vulnerability for postpartum depression, there is a need to refine the methods used. The analyzed instruments do not accurately differentiate between expectations, previous experiences, beliefs and attitudes related to motherhood. Recent studies (Church, 2009; Phillips, 2010) advance the hypothesis of the heterogeneity of postpartum depression: (re)activation of the general vulnerability for depression by a postnatal stressor and/or activation of a specific vulnerability for postpartum depression, but not for general depression. However, advancement in understanding the mechanisms of developing postpartum depression is difficult without progress in terms of the assessment methods used. These studies aim to capture the heterogeneity of postpartum depression using cognitive vulnerability assessment methods existing in the literature. Or, on one hand, cognitive vulnerability assessment tools for depression in the context of perinatal

lack adequacy, thus diminishing their predictive and explanatory power. And, on the other hand, specific cognitive vulnerability assessment tools lack an explanatory theoretical model.

3.4. Discussions and future directions

The results of this analysis reveal the role of cognitive vulnerability factors investigated in relation to postpartum depression, the weaknesses and strengths of cognitive vulnerability assessment instruments used in literature, and the progress made in recent years in the literature on cognitive vulnerability to postpartum depression. The study also identifies gaps in the present literature and possible future research directions. First, further investigation of Beck's model (1967) in relation to postpartum depression and the use of longitudinal study designs. Then to explore specific vs. general cognitive vulnerability for postpartum depression and investigate Ellis's model (1962) on psychopathology in relation to postpartum depression.

Chapter IV
Study 2. Cognitive vulnerability and postpartum mood[2]

4.1. Introduction

The postpartum is a unique timeframe for women in terms of neuroendocrine changes and strains on coping mechanisms. Research on the etiology of postpartum depression has been focused on both biological and psychosocial factors. Figure 2 shows a theoretical integrative model of postpartum mood disturbance, built within a stress-vulnerability framework. As childbirth is accompanied by dramatic hormonal changes, biological factors have been extensively explored in relation to postpartum depression. Apparently, there is a vulnerability in a subgroup of women to the normal perinatal changes in gonadal steroid levels, but the genetic, neuronal and environmental mechanisms require further investigation (O'Hara & McCabe, 2013).
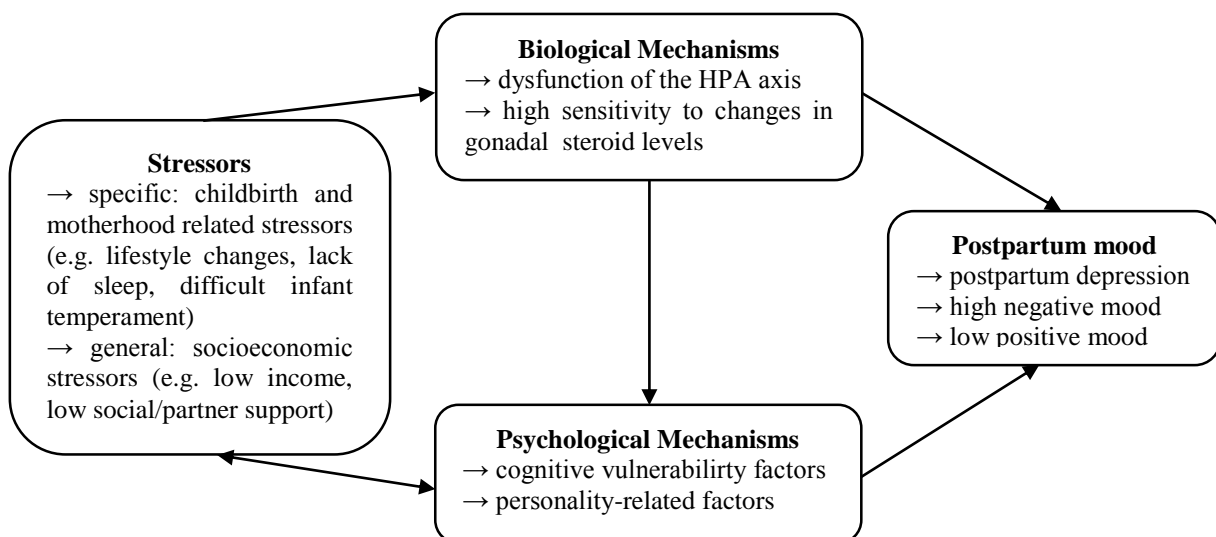
Figure 2. A theoretical integrative model of postpartum mood disturbance

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[2] Mureșan-Madar, A. & Băban, A. (2014). Insights on postpartum mood: Why childbirth is associated with depression and mixed feelings? In Dumitrașcu, D. L. & Soellner, W. (Ed.) *Annual Meeting of the EAPM 2014* (196-200). Bologna: Medimond International Proceedings.

Meta-analyses on risk factors for postpartum depression point as the strongest predictors for postpartum depression to depression and anxiety in pregnancy and a lifetime history of depression (O'Hara & Swain, 1996; Beck, 2001; Robertson et al., 2004). Cognitive theories of psychopathology contributed to the understanding of the underlying mechanisms of depression and anxiety. Therefore, the hypothesis that cognitive factors can improve the understanding of the mechanism of postpartum depression has emerged. Two cognitive vulnerability theories have been tested in relation to postpartum depression: the reformulated learned helplessness model (Abramson, Seligman, & Teasdale, 1978) and Beck's cognitive model of depression (Beck, 1987).

Initial studies on cognitive predictors for postpartum depression showed promising results for the attributional style (O'Hara, Rehm, & Campbell, 1982; Cutrona, 1983), while dysfunctional beliefs did not seem to have a significant contribution (O'Hara et al., 1982; Gotlib, Whiffen, Wallance, & Mount, 1991). More recent studies however, fail to reply the results for the attributional style (O'Hara, Neunaber, & Zekoski, 1984; Grazioli & Terry, 2000) and provide evidence for dysfunctional beliefs as a predictor for postpartum depression (Grazioli & Terry, 2000; Church, Dunstan, Hine, & Marks, 2009; Phillips, Sharp, Matthey, & Charles, 2010).

The main purpose of the present study was to investigate the role of cognitive vulnerability in the development of postpartum depression. Additionally, it aimed to test cognitive vulnerability in relation to postpartum mood in general. Cognitive vulnerability was addressed through Beck's cognitive model of depression (Beck, 1987). Postpartum depression was defined as a high depressive symptomatology on The Edinburgh Postnatal Depression Scale (EPDS: Cox, Holden, & Sagovsky, 1987).

4.2. Methods

Pregnant women were recruited antenatally, in the last trimester of pregnancy (Time 1), and followed postpartum, in the first three months following childbirth (Time 2). By online assessment, 133 women provided records at both times. Self-report instruments were used to assess dysfunctional attitudes and depressive symptomatology antenatally. Additional questionnaires for automatic thoughts and emotional distress were completed postpartum. Participants were aged between 19 and 40 years (Mean=30.56 years, S.D.=5.5). 41.4% of the sample reported a significant level of postpartum depressive symptomatology if using 12 as the cut-off score on the Edinburgh Postnatal Depression Scale (Wallis et al., 2012), and 33.8% if using 13 as a cut-off score (Cox et al., 1987).

4.3. Results

4.3.1. Descriptive statistics

Table 1 displays the means, standard deviations, and correlation coefficients between depressive symptomatology (at Time 1 and Time 2), and dysfunctional attitudes (at Time 1 and Time 2), automatic thoughts (at Time 2) and emotional distress (at Time 2). Dysfunctional attitudes are related not only to postpartum depressive symptomatology (r=0.42, p<0.01), but also to functional negative emotions (r=0.30, p<0.01) and to positive emotions (r=0.33, p<0.01).

Table 1. Summary of Means (M), Standard Deviations (SD), and Pearson Correlations between depressive symptomatology, dysfunctional attitudes, automatic thoughts, and emotional distress (N=133)

| Variables (Time) | M | SD | Correlations | | | | | |
			1.1.	1.2.	2.1.	2.2.	3	4
1.1. Depressive symptomatology (Time 1)	9.79	4.32						
1.2. Depressive symptomatology (Time 2)	12.16	5.03	.761**					
2.1. Dysfunctional attitudes (Time 1)	118.96	21.31	.394**	.280**				
2.2. Dysfunctional attitudes (Time 2)	119.86	22.57	.332**	.424**	.613**			
3. Automatic thoughts (Time 2)	26.41	7.95	.536**	.689**	.406**	.644**		
4. Emotional distress (Time 2)	72.56	16.62	.654**	.856**	.252**	.381**	.745**	

**p<0.01

4.3.2. Regression analysis

Regression analysis was used to test if cognitive vulnerability explains participants' ratings of postpartum depression. Prenatal levels of dysfunctional attitudes explained 8% of the variance in postpartum depressive symptomatology, $F(1,132)=11.11$, $p<.001$. Antenatal depressive symptomatology alone predicted 58% of postpartum depressive symptomatology, $F(1,132)=180.52$, $p<.001$.

Table 2 Regression analyses

	R²	F	df	Sig. (2-tailed)
Dysfunctional attitudes (T1)	,078	11,111	1 132	,001
Depressive symotomatology (T1)	,579	180,516	1 132	,000

4.3.3. Mediation analysis

To identify if there is an mediation effect and the mediation type, it was used the analysis method proposed by Baron & Kenny (1986), based on testing a succession of three regression equations: (c) the direct effect of the independent variable on the dependent variable, (b) independent mediator effect on the dependent variable and independent variable effect (a) the effect of the independent variable on the mediator. According to Baron & Kenny (1986), three criteria must be met to determine the effect of mediation: (1) the independent variable must predict the mediator, (2) the mediator must predict the dependent variable after the inclusion of the independent variable in the model and (3) the association between the independent variable and the dependent variable should be reduced (partial mediation) or become insignificant (total mediation) after including the mediator model.

The mediation effect of prenatal depressive symptomatology on the relationship between dysfunctional attitudes and postpartum depressive symptomatology. The variance in the prenatal level of dysfunctional attitudes significantly explained the variance in the prenatal depressive symptoms ($\beta=.394$, $t=4.91$, $p<0.001$). The variance in prenatal depressive symptoms significantly explained the variance in postnatal depressive symptoms ($\beta=.771$, $t=12.46$, $p<0.001$). The effect of dysfunctional attitudes on postpartum depressive symptoms became statistically insignificant when prenatal depressive symptoms was included in the model ($\beta=-.024$, $t=-.392$, $p>0.05$). The Sobel test performed for the effect of mediation was statistically significant ($Z=4.64$, $p<0.001$). In Figure 3 threre are the results of this mediation analysis. The

level of prenatal depressive symptoms mediates entirely the effect of prenatal dysfunctional attitudes prenatal on postpartum depressive symptomatology.

a=.080*** (Sa=.016)   Prenatal depressive symptomatology   b=.898*** (Sb=.072)

Dysfunctional attitudes   c=.066*** β=.280*** c′=-.006 β=-.024 Z=4,64*** ***p<0.001   Postpartum depressive symptomatology
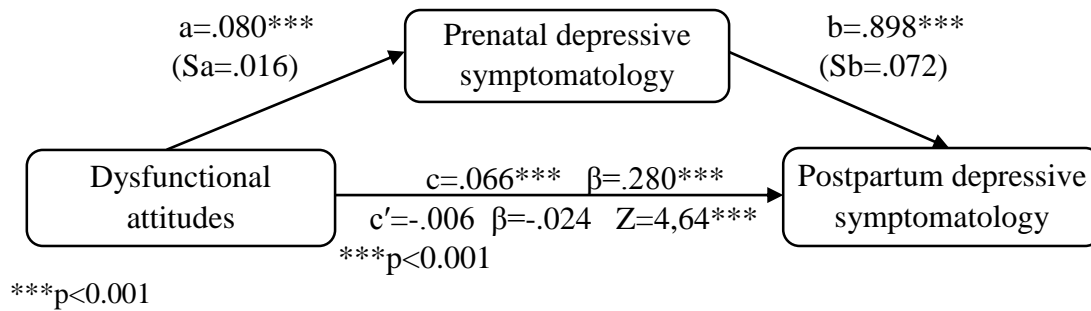
***p<0.001

Figure 3. The mediation effect of prenatal depressive symptomatology on the relationship between dysfunctional attitudes and postpartum depressive symptomatology

The mediation effect of automatic thoughts on the relationship between dysfunctional attitudes postpartum and depressive symptoms. Postnatal variance in the level of dysfunctional attitudes significantly explained variance in the automatic thoughts (β=.644, t=9.64, p<0.001). Variance in automatic thoughts levels significantly explain the variance in postnatal depressive symptoms (β=.710, t=8.54, p<0.001). The effect of dysfunctional attitudes on postpartum depressive symptoms became statistically insignificant when automatic thoughts were included in the model (β =-.033, t =-.402, p>0.05). The Sobel test performed for the effect of mediation was statistically significant (Z = 6.35, p <0.001). In Figure 4 there are the results of this mediation analysis. Postpartum, automatic thoughts mediate entirely the effect of dysfunctional attitudes on postpartum depressive symptoms.

a=1.829*** (Sa=.190)   Automatic thoughts   b=.449*** (Sb=.053)

Dysfunctional attitudes   c=.094*** β=.424*** c′=-.007 β=-.033 Z=6,35***   Postpartum depressive symptomatology

***p<0.001
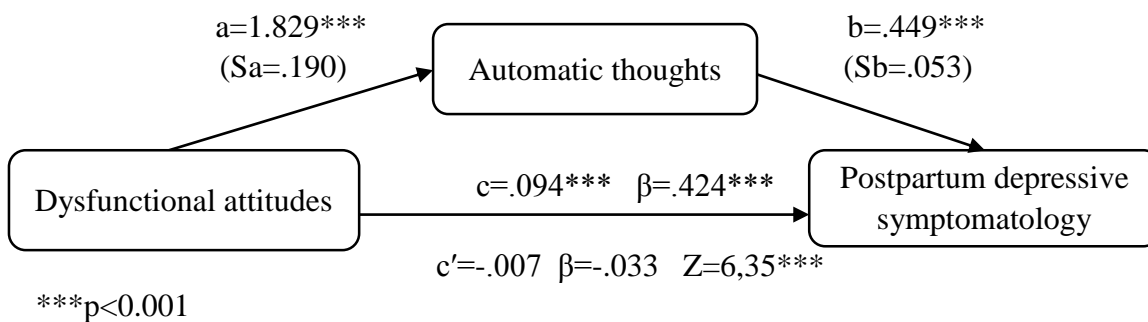
Figure 4. The mediation effect of automatic thoughts on the relationship between dysfunctional attitudes postpartum and depressive symptoms

4.3.4. Paired-Samples T Test analyses
Two Paired-Samples T Test analyses were computed to test differences over time in postpartum depression levels and in dysfunctional attitudes. There are significant differences in depressive symptomatology over time, t(132)=8.28, p<0.05, with higher depressive symptomatology levels at Time 2. As expected, no significant differences were found in dysfunctional attitudes, t(132)=0.53, p>0.05.

Tabele 4 Paired-Samples T Test

	t	df	Sig. (2-tailed)
Dysfunctional attitudes (T1) – Dysfunctional attitudes (T2)	-,538	132	,591
Depressive symptomatology (T1) – Depressive symptomatology (T2)	-8,284	132	,000

4.3.5. ANOVA independent measures

To highlight the evolution of depressive symptoms in the perinatal period, the sample was divided into subgroups and to evaluate whether cognitive vulnerability factors discriminate between these subgroups with different symptoms the significance of differences between them was tested. The categories defined in the sample based on the level of depressive symptoms are: (1) low level of prenatal depressive symptoms (EPDSprenatal<12) and postnatal (EPDSpostnatal<12) (sub-clinical/subclinical N=58), (2) postnatal depressive symptoms - low prenatal depressive symptoms (EPDSprenatal<12) and increased levels of postnatal depressive symptoms (EPDSpostnatal≥12) (subclinical/clinical, N = 33), (3) prenatal depressive symptoms - high levels of prenatal depressive symptoms (EPDSprenatal≥12) and low postnatal depressive symptoms (EPDSpostnatal<12) (clinical/subclinical, N = 7), (4) prenatal depressive symptoms - high levels of prenatal depressive symptoms (EPDSprenatal≥12) and high levels of postnatal depressive symptoms (EPDSpostnatal ≥12) (clinical/clinical, N = 35). ANOVA for independent measurements was used to compare the four groups on the cognitive vulnerability (negative automatic thoughts and dysfunctional attitudes) dependent variables.

There are differences between the groups, both in dysfunctional attitudes levels $F(3,129)=9.46$, $p<0.01$, as well as in negative automatic thoughts levels $F(3,129)=23.42$, $p<0,01$. To estimate the specific differences between the four groups Tukey posthoc analysis was selected and adapted for samples with unequal number of participants using harmonic mean. There is a significant difference in terms of dysfunctional attitudes between participants with a low perinatal level of depressive symptoms (subclinical/subclinical) and those with increased levels of postnatal depressive symptoms (subclinical/clinical; Tukey =-17.42, $p<0,01$), namely those with increased perinatal level of depressive symptoms (clinical/clinical; Tukey=-21.31, $p<0.01$). There is a significant difference in terms of dysfunctional attitudes among participants with increased levels of postnatal depressive symptoms (subclinical/ clinical) and those with increased prenatal levels of depressive symptoms (clinical/subclinical; Tukey=10.11, $p>0.10$) and those with increased perinatal level of depressive symptoms; Tukey=-3.89, $p>0.10$). There is a significant difference in terms of negative automatic thoughts between people with a low perinatal level of depressive symptoms (subclinical/subclinical) and those with increased levels of postnatal depressive symptoms (subclinical/clinical; Tukey=4.81, $p<0.01$) and those with increased perinatal level of depressive symptoms (clinical/clinical; Tukey=-11.03, $p<0.01$).

4.4. Conclusions and discussions

The present study investigated the role of cognitive vulnerability in the development of postpartum depression and its relation to postpartum mood in general. Its results offer an insight on postpartum mood and its underlying psychological mechanisms. As expected, high postpartum depression rates are associated with a more dysfunctional cognitive style reflected in high dysfunctional attitudes scores and high frequency of negative automatic thoughts. This cognitive factors also influence the global postpartum mood, including negative functional emotions and positive emotions. The effect of general cognitive vulnerability (schema, dysfunctional attitudes) on postpartum depressive symptoms is mediated entirely by automatic thoughts and by prenatal depressive symptoms. Participants with increased perinatal or

postnatal depressive symptoms had, on average, higher levels of dysfunctional attitudes and a higher frequency of automatic thoughts compared to those who had a low perinatal level of depressive symptomatology. There is a significant difference in terms of dysfunctional attitudes among people with lower levels of depressive symptoms increased postnatal and prenatal or perinatal an increased level of depressive symptomatology. These results confirm the pathways of development for postpartum depression described by Wisner, Moses-Kolko & Sit (2010).

This study provides evidence for an underlying cognitive vulnerability for postpartum depression, stable over the peripartum. Not surprisingly, as depression and anxiety in pregnancy and a lifetime history of depression are the strongest predictors for postpartum depression (Robertson et al., 2004). In regard to postpartum depression, there appears to be a continuum of depressive symptomatology throughout the perinatal period, with higher postpartum rates. This suggests that childbirth and motherhood can act as an activating event for psychological vulnerabilities, triggering postpartum depression in a subgroup of vulnerable women. It remains to be further investigated whether this cognitive vulnerability is general or motherhood-specific.

CHAPTER V
Study 3. Features of the cognitive vulnerability for postpartum depression

5.1. Maternal Attitudes and Beliefs Scale: a pilot study[3]

5.1.1. Introduction
Cooper & Murray (2005) advance the hypothesis of the existence of two categories of women with postpartum depression. On one hand, there are those with a general cognitive vulnerability to depression developing postpartum depression following childbirth and childcare as non-specific stressors, and on the other hand there are those for whom motherhood is a specific stressor directly related to depression.

Based on this assumption, a number of studies (Warner et al., 1997; Church et al., 2009; Phillips et al., 2010) focused on cognitive factors as distinct features of women with postpartum depression. The underlying hypothesis of these studies is that cognitive vulnerability in women with postpartum depression falls into two categories: (re)activating a general cognitive vulnerability to depression by a postpartum specific stressor and/or activating a specific cognitive vulnerability to postpartum depression, but not to general depression.

In line with this insight, exactly the heterogeneity of postpartum depression could impair its measurement with the well-validated instruments for cognitive vulnerability to general depression such as the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). Whereas the instruments used to assess attributional style do not show sound psychometric properties (Grazzioli & Terry, 2000). In addition, general cognitive vulnerability assessment instruments for depression lack specificity and thematic congruity with women with postpartum depression thought content. A widely used instrument for the assessment of specific cognitive vulnerability is the Maternal Attitudes Questionnaire (MAQ, Warner et al., 1997). MAQ covers cognitions relating to role change, expectations of motherhood and expectations of the self as a mother in postpartum women. In comparison to other instruments measuring cognitive vulnerability, one major strength of MAQ is its specificity and its thematic congruence with thought content in postpartum depression, while one possible weakness could be that it is not

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[3] Madar, A. (2013). Maternal Attitudes and Beliefs Scale: Development and Piloting. *Procedia - Social and Behavioral Sciences*, 78, 415 – 419.

related to any of the cognitive theories of general depression. The understanding of the underlying mechanisms of postpartum depression would considerably improve, resulting in targeted and therefore more effective treatments, only if instruments assessing cognitive vulnerability to postpartum depression would capture the distinct cognitive features of postpartum depressed women.

Beck's theory of depression and the Hopelessness theory of depression, have been more extensively investigated in relation to postpartum depression, while little attention has been paid to Ellis's cognitive theory for psychopathology (Rational Emotive Behaviour Theory/Therapy; REBT, Ellis & Dryden, 1997). Milgrom & Beatrice (2003), investigating cognitive and defense styles of women experiencing postpartum depression, identified differences in depressed and non-depressed women on most attitudes and beliefs regarded as REBTcore constructs. Depressed women had less rational and more irrational beliefs and were different on almost very subscale: higher rates of self-downing, higher needs for achievement, and approval, more demanding of fairness, and more need for comfort.

The main objectives of this study were (1) the development of a specific cognitive vulnerability measure for postpartum depression developed based on Ellis (Ellis, 1962 Ellis & Dryden, 1997) the model of psychopathology and (2) the preliminary testing of the Maternal Attitudes and Beliefs Scale in relation to postpartum depression. Additionally, this study aimed to (3) test general cognitive vulnerability factors (irrational beliefs) in relation to postpartum depressive symptoms.

5.1.2. The development of Maternal Attitudes and Beliefs Scale

The systematic literature analysis on the cognitive vulnerability to postpartum depression indicated the need of an instrument for maternal beliefs developed within a theoretical model of general depression. Maternal Attitudes and Beliefs Scale (MABS) was designed as an instrument for assessing core constructs in REBT (Ellis, 1962 Ellis & Dryden, 1997) enhancing their thematic relevance to the postpartum context.

Items were designed so their contents reflect both principles of rational emotive and behavioral theory and motherhood specific themes (ex. childcare, body changes, poor sleep, role changes: the role of mother and activity limitation).

In developing MABS, we started from existing scales in the literature on general beliefs (ABS-2, DiGiuseppe, Leaf, Exner & Robin, adapt. Macavei, 2007), perinatal maternal attitudes (MAQ, Warner et al., 1997; PRBQ , Moorhead et al., 2003; BAM-13, Matthey, 2011) and from interviews with women about motherhood experience (Madar & Baban, 2010).

MABS measures the irrational beliefs: demandingness (DEM, 20 items), glabal evaluation/self-downing (GE/SD, 20 items), low frustration tolerance (LFT, 10 items) and awfulizing (AWF, 5 items) and their rational beliefs correspondent: preferential assessment of the character of an aversive event, frustration tolerance, unconditional self acceptance and evaluation of specific behaviors.

5.1.3. Method: participants and procedure

42 women in their first three months postpartum completed questionnaires on depressive symptoms (EPDS, Cox et al., 1987, adapt. Wallis et al., 2012), attitudes and beliefs (ABS-2, DiGiuseppe, et al., Adapt. Macavei, 2007) and maternal attitudes and beliefs (MABS). The participants were aged between 24 and 37 years (M = 29.19 years, SD = 2.8). 26.2% reported a significant level of postpartum depressive symptoms if we use 12 to EPDS score critic (Wallis et al., 2012) and 23.8% if we use 13 as the critical score (Cox et al., 1987).

5.1.4. Results

5.1.4.1. Scale validity

Table 3 shows the means, standard deviations and Pearson correlations between depressive symptoms, maternal attitudes and beliefs and general attitudes and beliefs. MABS is significantly related both with postpartum depressive symptoms (r=0.55, p<0.01) and with general attitudes and beliefs (r=0.76, p<0.01).

Table 3. Means, standard deviations and Pearson correlations between depressive symptoms, maternal attitudes and beliefs and general attitudes and beliefs

Variables	M	SD	Correlations		
			1.	2.	3.
1. Postpartum depressive symptomatology (EPDS)	8.55	5.71			
2. Maternal attitudes and beliefs (MABS)	81.76	26.72	.549**		
3. General attitudes and beliefs (ABS-2)	94.14	36.44	.587**	.761**	

**p<0.01

MABS subscales, excepting DEM, are significantly correlated with corresponding subscales from ABS-2: DEM (r=0.29, p>0.05), SD/GE (r=0.76, p<0.01), LFT (r=0.66, p<0.01), AWF (r=0.60, p<0.01).

5.1.4.2. Scale reliability – internal consistency

Preliminary data from this study indicate a very good internal consistency of the scale, appropriate for using the instrument (Cronbach Alpha .94). The good internal consistency of the scale indicates that the test items are assessing the same construct - irrational beliefs related to motherhood.

Subscales internal consistency analysis indicates a very good internal consistency for SD/GE subscale (Cronbach alpha .95) and good consistency for DEM (Cronbach Alpha .70), LFT (Cronbach Alpha .80) and AWF (Cronbach Alpha .75).

5.1.5. Conclusions and future directions

Initial results show that MABS can become a valid instrument for assessing individual differences in specific irrational beliefs related to motherhood, but the small number of participants compel that study findings should be treated with caution. MABS requires validation and refinement by applying on a larger population, factor analysis and exclusion of redundant items. The items of DEM subscale require further analysis since MABS may not distinguish semantically clear between demandingness and preference for motherhood specific topics. Preliminary data justifies future investigation of cognitive vulnerability to postpartum depression based on Ellis (Ellis, 1962 Ellis & Dryden, 1997) cognitive model of psychopathology.

5.2. Characteristics of the cognitive vulnerability for postpartum depression[4]

5.2.1. Introduction

The systematic literature analysis on cognitive vulnerability to postpartum depression showed that two cognitive constructs were tested in relation to postpartum depression: dysfunctional attitudes (Beck's cognitive model of depression, Beck, 1967) and attributional

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[4] Madar, A. (2013). General and Specific Maternal Cognitions in Postpartum Depression: an Explorative Study. *Procedia - Social and Behavioral Sciences*, 78, 420 – 424.

style (reformulated model of learned helplessness, Abramson, Seligman, & Teasdale, 1978 hopelessness theory, Abramson, Metalsky & Alloy, 1989). Too little attention has been paid to the investigation but irrational beliefs (therapy / rational emotive behavior theory, REBT, Ellis, 1962 Ellis & Dryden, 1997) as a cognitive vulnerability factor for postpartum depression.

Milgrom & Beatrice (2003) investigated cognitive and coping styles of women with postpartum depression. The authors identified differences between women with depression and those without depression in most attitudes and beliefs regarded as core REBT constructs (Ellis, 1962; Ellis & Dryden, 1997). Women with depression had lower levels of rational beliefs and higher levels of irrational beliefs and differed on almost all subscales: higher rates of self-downing, higher needs for approval and achievement, demandingness for fairness and a higher need of comfort.

The strongest risk factors for postpartum depression are depression or anxiety in pregnancy, a history of personal depressive episode and low social support (Robertson et al., 2003, Beck, 2001 O'Hara & Swain, 1996). Cognitive theories of psychopathology have contributed significantly to the understanding of the underlying mechanisms of depression and anxiety. But the way cognitive factors interact with low social support in postpartum depression is limited investigated in the literature.

Analyzing the literature on the relationship between social support and postpartum depression, it seems that certain types of social support increase the risk for poor postpartum depressive symptoms. For example: not having a confidant or a person with whom to talk and a unsatisfactory couple relationship (Romito, saurel-Cubizolles & Lelong, 1999), reporting marital difficulties (Mauthner, 1998) or perceived lack of support from members from primary support group (ie. not receiving support without asking, not having someone to talk to having similar problems; Brugha et al., 1998). It seems that postnatal professional support is protective in the first 6 weeks postpartum, but the results are not significant for the support of non-professionals in the prevention of postpartum depression (Dennis & Creedy, 2007). But the factors involved in the relationship between social support and postpartum depression require further investigations. The literature on the relationship between social support and emotional distress creates possible research directions.

Social support is conceptualized as the subjective perception of the support a person may have, and this is not necessarily a reflection of actual behaviors. It seems that the perception of support is relatively stable over time and it is related to cognitive constructs such as dysfunctional beliefs and attributional style (Lakey & Cassady, 1990). It also is associated with differences in social information processing: people with perceived high social support evaluate the same behaviors as more supportive than people with perceived low social support, but also have a better memory of behaviors relevant support (Lakey & Drew, 1997). The relationship between negative social interactions and distress can be influenced by dysfunctional beliefs (Lakey, Tardiff & Drew, 1994). Lakey & Cohen (2000) suggests that dysfunctional thoughts about social relations in itself sufficient to cause distress.Also, Lakey & Cohen (2000) present an integrative model on the role of social support in a persons response to stressful situations and to the way it interacts with cognitive factors. So a dysfunctional or irrational cognitive style may influence how social support is perceived in the postnatal period.

The objectives of the present study were: (1) the investigation of Ellis's model on psychopathology in relation to postpartum depression, (2) to investigate the relationship between postpartum cognitive vulnerability factors (irrational beliefs, cognitive processes, content areas), depressive symptoms and types of perceived social support and (3) to identify the way irrational beliefs interract with social support in relation to the development of postpartum depressive symptomatology.

5.2.2. Method

94 women in their first three months postpartum completed questionnaires on depressive symptoms (EPDS, Cox et al., 1987, adapt. Wallis et al., 2012), irrational attitudes and beliefs (ABS-2, DiGiuseppe et al., Adapt. Macavei, 2007) and perceived social support (MOS Social Support Survey, Sherboune & Stewart, 1991). The participants were aged between 19 and 38 years (M = 27.56 years, SD = 4.1). 44.7% reported a significant level of depressive symptoms postpartum, if used the EPDS score 12 critical (Wallis et al., 2012) and 42.6% if used 13 as the critical score (Cox et al., 1987).

5.2.3. Results

5.2.3.1. Descriptive statistics

In Table 4 there are the means, standard deviations and Pearson correlations for depressive symptoms, social support, attitudes and irrational beliefs. Irrational attitudes and beliefs are significantly positively related with postpartum depressive symptoms (r=0.68, p<0.01) and significantly negatively with social support (r=-0.45, p<0.01). Cognitive processes like self-downing/global evaluation are stronger related with postpartum depressive symptoms (r = 0.78, p <0.01) than demandingness (r = 0.52, p <0.01), low frustration tolerance (r = 0.55, p <0.01) and catastrophizing (r = 0.53, p <0.01).

Table 4. Means, standard deviations and Pearson correlations for depressive symptoms, social support, attitudes and irrational beliefs

	EPDS	MOS	ABS-2	DEM	SD/GE	LFT	AWF
EPDS		-.448**	.681**	.522**	.777**	.551**	.530**
MOS			-.388**	-.431**	-.420**	-.297**	-.228*
M(SD)	11.15	76.36	106.40	30.46	22.88	27.83	25.23
	(6.74)	(13.81)	(35.72)	(8.40)	(12.94)	(9.26)	(9.01)

p<0.01

Table 5 presents the Pearson correlations between postpartum depressive symptoms, social support types and content types of attitudes and beliefs. Low tangible social support is more strongly associated with postpartum depressive symptoms (r=-0.59, p<0.01) than low emotional/informational support (r=-0.30, p<0.01), affective support (r=-0.20, p< 0.01) and positive social interactions (r=-0.23, p<0.01). Confort irrational beliefs are related to tangible social support (r =-0.47, p<0.01) and affective (r = -0.35, p <0.01) social support perceived as low. Irrational beliefs on achievement are related to the perception of tangible social support tangible (r=-0.35, p<0.01) and positive social interactions (r=-0.25, p<0.01) as low. Irrational beliefs on approval are related to the perception of tangible social support (r=-0.33, p<0.01), emotional/informational (r=-0.36, <0.01) and affective (r = -0.25, p <0.01) as low.

Table 5. Pearson correlations between postpartum depressive symptoms, social support types and content types of attitudes and beliefs (N=94)

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. EPDS								
2. ABS-confort	.651**							
3. ABS-achievement	.627**	.766**						
4. ABS-approval	.567**	.697**	.710**					
5. MOS-em/info supp	-.302**	-.188	-.171	-.361**				
6. MOS-tangible supp	-.589**	-.486**	-.351**	-.328**	.504**			
7. MOS-affectivs supp	-.205*	-.349**	-.175	-.251*	.488**	.437**		
8. MOS-pos soc interact	-.230*	-.197	-.249*	-.186	.488**	.195	.357**	

**p<0.01, *p<0.05

5.2.3.2. Mediation analysis

A need was identified to consider simultaneously the effects of vulnerability factors and their interaction in explaining depressive symptoms postpartum. Therefore, investigating isolated vulnerabiltate factors was completed by testing of possible pathways or mechanisms of interaction between cognitive vulnerability factors (attitudes and beliefs irrational) and psychosocial (social support). To identify if there is an effect mediator and mediation type of analysis was used method proposed by Baron & Kenny (1986), based on testing a succession of three regression equations (see Study 2).

The mediation effect of perceived social support on the relationship between irrational beliefs and postpartum depressive symptoms. The variance in irrational beliefs levels significantly explains the variance in perceived social support (β =-.388, t=-4.04, p<0.001). The variance of perceived social support significantly explains the variance of postpartum depressive symptoms (β =-.217, t=-2.70, p<0.01). The effect of irrational beliefs on postpartum depressive symptoms decreases significantly when perceived social support is included in the model (β =.597, t=7.442, p<0.001). The Sobel test performed for this mediation effect was statistically significant (Z=2.30, p<0.001). In Figure 5 there are the results of this mediation analysis. The perceived level of social support partially mediates the effect of irrational beliefs on postpartum depressive symptoms.
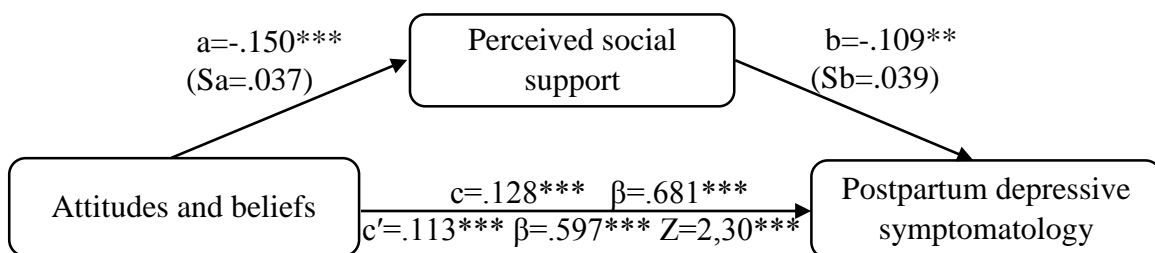
***p<0.001, **p<0.01

Figure 5. The mediation effect of perceived social support on the relationship between irrational beliefs and postpartum depressive symptoms.

5.2.3.3. Independent-Samples T Test analyses

The sample was divided by cut-off score for depressive symptoms scale and it was tested whether there are differences between the two groups in terms of cognitive vulnerability factors. Women with an EPDS score>12 (N=42, probable cases of at least mild depression) differ from

those with a score EPDS≤12 (N=52) on all subscales of ABS-2: have higher needs for comfort, t(92)=7.82, p<0.005, achievement, t(92)=6.81, p<0.005, approval, t(92)=6.32, p<0.005 and higher rates of demandingness, t(92)=6.23, p<0.005, self-downing, t(92)=10.69, p<0.005, low frustration tolerance, t(92)=6.07, p<0.005 and catastrophizing, t(92)=4.89, p<0.005.

5.2.4. Conclusions and implications

Perceived social support assessed in terms of presence/absence and frequency may act as a partial mediator of the relationship between attitudes/irrational beliefs and postpartum depressive symptoms. The results should be regarded with some reserve since the variables involved in assessing social support and the relationship between social support and irrational beliefs requires further investigation (e.g. the differences between real social support, perceived social support and satisfaction/dissatisfaction with perceived social support).

Increased levels of postpartum depressive symptoms are associated with higher levels of irrational beliefs and a lower level of perceived social support. An increased global level of irrational beliefs is related to reporting low levels of tangible social support. A high level of irrational beliefs on approval is related to the reporting low emotional support/information and affective. A high level of irrational beliefs on comfort is related to the reporting a low level of emotional support. A high level of irrational beliefs on achievement is related to reporting a low levels of positive social interactions.

Mothers with depression are more likely to be dissatisfied with the quality of social support received. It seems that mothers with a global increase of irrational beliefs are more likely to experience tangible support as deficient in the postpartum period. In addition, depending on the content of the irrational beliefs will perceive as being low affective support or the emotional/informational or positive social interactions. Thus, supportive interventions can become more effective in reducing depressive symptoms postpartum if combined with cognitive interventions.

CAPITOLUL VI
Study 4. The efficacy of a CBT group intervention for postpartum depression[5]

6.1. Introduction

The perinatal period was long time considered a time of emotional wellbeing and a protective timeframe against psychiatric disorders. Motherhood is nowadays regarded as a life transition period testing and straining women's coping mechanisms. It precipitates not only psychotic episodes, but symptoms of depression are also a common feature of the postpartum period (Robertson, Celasun, & Steward, 2003). Prevalence rates for postpartum depression range from 5% to 25% depending on the characteristics of the population, the diagnostic and evaluation methods and the onset timeframe (Gaynes et al., 2005).

Pharmacotherapy, psychological and psychosocial interventions are common treatments for postpartum depression. Antidepressant medication is the most common treatment for postpartum depression (NICE, 2007). Four major approaches can be distinguished in literature regarding psychological treatments for postpartum depression: general counselling, interpersonal psychotherapy, cognitive-behavioural psychotherapy and psychodynamic therapy.

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[5] Mureşan-Madar, A. & Băban, A. (2015). The development and piloting of a CBT group program for postpartum depression. *Journal of Evidence-Based Psychotherapies*, 15(1), 53 – 66.

6.1.1. Treatment choices for postpartum depression

The treatment decisions for postpartum depression in women who are breastfeeding are highly influenced by their concerns about the consequences of infant exposure to antidepressant medication. In a pilot study on patient choice of treatment for postpartum depression comparing medication (sertraline) to psychotherapy (Interpersonal Therapy, IPT) most women chose psychotherapy with or without medication (Pearlstein et al., 2006).

At the same time, the risks associated with antidepressant treatment during breastfeeding lower the threshold for psychological treatments (NICE, 2007). Therefore the 2007 NICE clinical guideline strongly recommends switching to psychological therapy (Cognitive-Behavioural Therapy, CBT or IPT) for mild to moderate depressive episode and combining antidepressant with psychological treatment in severe depressive episode.

Interpersonal therapy has been extensively investigated and proven to be an effective intervention for postpartum depression. Two key issues addressed in interpersonal therapy are role transitions and interpersonal relationships (O'Hara, Stuart, Gorman, & Wenzel, 2000; Mulcahy, Reay, Wilkinson, & Wenzel, 2010). There is a great variability in cognitive-behavioural interventions for postpartum depression. Some consist of counselling and practical problem solving addressing issues like managing the infant, lack of practical support, difficulty coping, lack of enjoyable activities (Cooper, Murray, Wilson, & Romaniuk, 2003; Milgrom, Negri, Gemill, McNeil, & Martin, 2005). If interpersonal therapy was mostly delivered by professionally trained therapists (O'Hara et al., 2000; Mulcahy et al., 2010), cognitive-behavioural interventions were mostly delivered by health visitor nurses (Appleby, Warner, Whitton, & Faragher, 1997; Cooper et al., 2003). Unlike interpersonal interventions which were implemented based on a standard treatment manual, cognitive-behavioural interventions were instantiated in different ways, but none based in standard cognitive therapy (CT-CBT, Beck, 1967 or CT-REBT, Ellis, 1962). Brief psychodynamic therapy was focused on mothers' representations of their infant and childbirth related problems (Bloch et al., 2012; Cooper et al., 2003). General counselling, known as Listening Visits, also focuses on mother's relationship with the child and on the practical problems experienced. The Listening Visits intervention is a client-centered counselling delivered by nurses who provide home visiting. It was developed and has been widely implemented in UK, and more recently embraced in US (Segre, Stasik, O'Hara, & Arndt, 2010).

Several literature reviews and meta-analyses were conducted in the past 15 years on the treatment of postpartum depression (Boath & Henshaw, 2001; Dennis, 2003, 2005; Dennis & Brown, 2014; Bledsoe & Grote, 2006; Chabrol & Callahan, 2007; Cuijpers, Brannmark, & Straten, 2008; Leis, Mendelson, Tandon, & Perry, 2009; Sockol, Epperson, & Barber, 2011).

Apparently, interventions with only a postnatal component are more beneficial than interventions that incorporated an antenatal component (Dennis, 2005) and postpartum implementation alone produced larger effect size than implementation during pregnancy (Bledsoe & Grote, 2006). In addition, individually based interventions are more effective than group based interventions (Dennis, 2005) and individual psychotherapy was superior to group therapy with regard to changes in symptoms from pretreatment to posttreatment (Sockol et al., 2011). However, the most recent review of Goodman & Santangelo (2011) provides initial support for the role of group therapy in the treatment of postpartum depression. Additionally, interventions including an interpersonal therapy component were found to have greater effect sizes compared to control conditions than interventions including a cognitive behavioural component (Sokol et al, 2011). Studies with waiting list control groups had a larger mean effect size than studies with a care-as-usual control group (Cuijpers at al., 2008).

6.1.2. CBT for postpartum depression: current status and characteristics

The past 40 years have witnessed the ascendance of CBT as both the most influential and the most widely studied form of psychotherapy for depression (Friedman & Thase, 2006). Although cognitive behavioural therapy is acknowledged as an effective treatment for depression, studies examining the effectiveness of CBT for postpartum depression are less conclusive. For postpartum depression, CBT is more efficient than treatment as usual (Chabrol et al., 2002; Meager & Milgrom, 1996), but has the same effect as nonspecific counselling (Milgrom et al., 2005). Cuijpers et al. (2008) meta-analysis found that psychological interventions overall lead to moderate improvements in symptoms if compared to wait-list or treatment-as-usual controls. However, the effect size of CBT for postpartum depression (.36; CI: 0.15, 0.58) was lower relative to CBT for general major depression (effect size: d=.68).

Regarding CBT for postpartum depression, Milgrom, Martin, and Negri (2006) pointed in the reviewed literature at the time the confusion created by the reliance on global terms like cognitive therapy to describe treatment components that may not be comparable between studies. Reviewing more recent literature, it appears that CBT interventions continued to be delivered with great variability across studies. In Appleby et al. (1997) CBT referred to counselling focused on offering reassurance and practical advice in the areas of difficulty coping, lack of enjoyable activities, lack of practical support and caring for older children. In Cooper et al. (2003) CBT was a modified form of McDonough's Interaction Guidance Treatment. Other studies used adaptations of Lewinsohn's Coping with Depression Course for postpartum depression group intervention (Milgrom et al., 2005; Milgrom et al., 2011) and for postpartum depression web-based delivery (Danaher et al., 2013). CBT strategies (Craig, Judd, & Hodgins, 2005) and CBT components (Meager & Milgrom, 1996) were also used and referred to as CBT interventions. As O'Hara & McCabe (2013) recently pointed out none of the CBT interventions were based in standard cognitive therapy (Beck's CBT-CT) and they were instantiated in very different ways. Several factors must be analyzed regarding the efficiency of CBT interventions: the therapist (specialist vs non-specialist), location (home vs. clinic), period (prenatal vs. postnatal), administration (therapy group vs individual therapy).

The therapist: specialist or non-specialist? The effect of the therapist's expertise on treatment outcome has not been yet considered. Therapists delivering postpartum depression interventions are mostly non-professionals: nurses (Prendergast & Austin, 2001; Milgrom et al., 2011; Cooper et al., 2003), public health workers (Craig et al., 2005), psychology students (Chabrol et al., 2002), research assistants (Danaher et al., 2013) and psychologists without being mentioned their level of expertise (Milgrom et al., 2011; Wiklund et al., 2010 ; Appleby et al., 1997; Austin et al., 2008). Only Milgrom et al. (2005) mentioned a senior therapist and clinical psychology professionals as co-therapists. This could explain way no difference was found between CBT delivered by nurses and CBT delivered by psychologists (Milgrom et al., 2011) between the ideal standard care (standard base) and CBT (Prendergast & AUSIN, 2001) or between CBT and non-directive counseling (Cooper at al., 2003).

Location: at home or in the clinic? In terms of the intervention location, a distinctive aspect of postpartum depression interventions is that they are often made at home moms (Cooper et al., 2003, Chabrol et al., 2002) rather than clinical or healthcare contexts (Milgrom et al., 2005; Milgrom et al., 2011).

Period: prenatal or postnatal? In general, postpartum interventions produce larger effect sizes than delivery during pregnancy (Bledsoe & Grote, 2006). Indeed, for CBT no difference was found in scores for depression between CBT intervention group and the control group in prenatal and up to 4 months postpartum (Austin et al., 2008). Also, there were no clinically significant effects for a prenatal CBT meeting (Chabrol et al., 2002), but further intervention significantly reduced postpartum depressive symptoms compared to the control group.

Delivery: group or individual intervention? Both individual CBT and group CBT have proven effect on reducing depressive symptoms. For postpartum depression, group therapy offers a number of advantages over individual therapy to reduce additional costs. The tendency towards isolation and inactivity is approached by joining a group outside the house. Mothers who meet in an intervention group report that they feel less isolated, are better able to be honest with their feelings and express their thoughts (Milgrom et al., 2006). Adaptation is facilitated and developed by sharing similar experiences, unrealistic expectations and fears. Personal expectations about motherhood and new life can be analyzed, questioned and restructured in the interaction between participats: maladaptive thoughts expressed by one participant may assist another to questione and to restructure his own beliefs. However, mothers can develop mutual solutions to practical problems. In addition, social support offered by specialists (Dennis & Creedy, 2007) and by people who have faced similar problems (Brugha et al., 1998) is a key element in postpartum depression.

Therefore, the present study sought to develop and examine the effectiveness of a CBT group-intervention. The intervention addressed postpartum depression and key issues in motherhood through mechanisms of change derived from Beck's cognitive therapy of depression (Beck, Rush, Shaw, & Emery, 1979). To enhance the relevance of Beck's CBT for postpartum depression, perinatal specific themes (O'Mahen et al., 2013) and key issues in interpersonal therapy for postpartum depression were considered. The two key issues addressed in interpersonal therapy for postpartum depression are: role transitions and interpersonal relationships (O'Hara et al., 2000; Mulcahy et al., 2010). These interpersonal themes were addressed in a CBT framework. O'Mahen et al. (2013) thematic analysis revealed themes relevant to CBT in 3 key domains: self, motherhood and interpersonal, emphasizing on issues regarding: motherhood myths, self-sacrifice and managing social support. These contributed to increasing the relevance for postpartum depression of the CBT program. Modifying CBT to fit the particular needs of postpartum women may improve outcomes and adherence. The goals of the program were: (1) to decrease postpartum depression symptomatology and (2) to have a significant impact on the processes as expected based on CBT (Beck, 1967, Beck et al., 1979). The developed intervention was expected to significantly: (1) decrease postpartum depression symptomatology, (2) decrease global affective distress (depression/sadness, anxiety/worry, low positive emotions) (3) increase positive emotions and (4) decrease dysfunctional attitudes, (5) low the frequency of automatic thoughts. The program was delivered by a therapist through 6 weekly 2-hours group sessions and a one month follow-up session.

6.2. Method
Women in the first three months postpartum were informed about the programme and invited to participate through news in local media and by GP reference. After signing in on the program's website, they were directed to the initial evaluation page. The online screening included a personal information questionnaire and Beck Depression Inventory II (BDI-II). Participants with a BDI-II score lower than 13 could download a leaflet on postpartum emotions. Women with BDI-II scores ranging 13-28 were informed on their current status an invited to complete their baseline evaluation in order to attend the next step of the program. The baseline evaluation consisted of measures for postpartum depression (EPDS), global affective distress (PDA), dysfunctional attitudes (DAS), automatic thoughts (ATQ). Based on the signing in order, they were randomly assigned to the intervention group (group-CBT) and to the control group (waiting list).When a number of 10 women was reached in each group, the signing in was temporary closed until they completed the intervention. Of the 60 women included in the study, three series of 10 women received the CBT intervention. The three series of 10 women assigned to control group (waiting list) were finally invited to a workshop on postpartum adjustment. EPDS and PDE were used for monitoring progress throughout intervention and

EPDS, PDE, DAS, ATQ for measuring final outcomes. The intervention comprised 6-weekly 2-hours group-sessions followed by a 1-month follow-up session. Women were offered a booster session upon request in the first 3 months following programme completion. The intervention was delivered by a therapist in a private practice office. Figure 6 summarizes the participants' selection process.
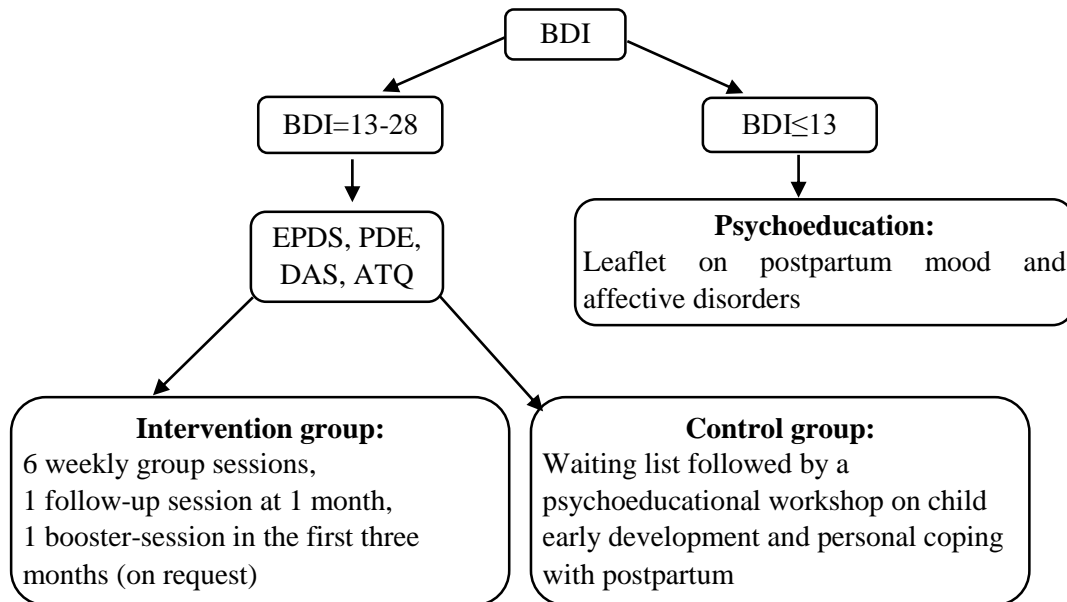

Figure 6. Participants selection process

The intervention program

The intervention protocol was developed by the authors of the present study. Standard CBT-CT interventions for depression (Leahy & Holland, 2010; David, 2007; Bilsker & Paterson, 2005; Beck, Rush, Shaw & Emery, 1979), CBT-CT group interventions (Bieling, McCabe & Antony, 2006; White & Freeman, 2000) and postpartum depression specific interventions with CBT components (Haring, Smith, Bodnar & Deirdre, 2011; Milgrom, Martin, & Negri, 2006) were analysed. Figure 7 prezents the intervention program.

In sessions 1 to 3, participants in the intervention program learned and became aware of the role played by behaviour and cognition in postpartum depression. Session 1 was focused on psychoeducation and CBT conceptualization for postpartum affective disorders. Session 2 emphasized on the role of pleasant activities in increasing mood. Participants developed a personal behavioural activation plan including scheduled pleasant activities, both alone and with the baby and/or the partner. Session 3 familiarized participants to cognitive therapy and the role of thoughts in depressive symptomatology. Subsequently, participants learned to identify their negative thoughts related to motherhood and interpersonal themes.

In sessions 4 and 5, participants learned to use effective strategies to identify, dispute and change dysfunctional thoughts to alternative, more realistic and functional ones. Specific themes such as: motherhood myths, the expectations on perfect mother/baby/partner, self-sacrifice attitudes, dysfunctional thoughts regarding interpersonal relationships and perceived social support were addressed and disputed in a CBT-CT framework.

Further on, in session 7, participants learned to improve their skills in assertive communication, time management and problem solving. Finally, at the follow-up session, they acknowledged their personal cognitive vulnerability, their triggering situations and effective ways to manage negative emotions in the future.

Figure 7. The intervention program

Intervention and evaluation	EPDS	PDE	ATQ	DAS
Week 1 *Postpartum affective disorders: psychoeducation and CBT conceptualization*	√	√	√	√
Week 2 *Behavioural ABC: plesant activities and depressive symptoms, behavioural activation*				
Week 3 *Cognitive therapy: the role of thoughts in depressive symptomatology, (1) identifying negative thoughts*	√	√		
Week 4 *The ABC of realistic thinking: (2) questioning negative dysfunctional thoughts*				
Week 5 *The ABC of realistic thinking: (3) developing alternative thoughts*				
Week 6 *Optimisation and personal development: assertive communication, time management, problem solving*	√	√	√	√
Week 10 *Follow-up and relapse prevention*	√	√		

6.3. Results

6.3.1. Intergrup comparisons: control vs intervention

Independent samples t test was used to test differences between the intervention and the control group in baseline and post-intervention depressive symptoms, emotional distress, positive emotions, attitudes and dysfunctional automatic thoughts.

Baseline. Table 6 shows values for t-test intergroup comparisons. No significant differences were found between the control group and the intervention group in postpartum depressive symptomatology, $t(58)=0,91$, $p>0,05$, global affective distress, $t(58)=1,87$, $p>0,05$, positive emotions, $t(58)=0,69$, $p>0,05$, automatic thoughts, $t(58)=1,385$, $p>0,05$, and dysfunctional attitudes, $t(58)=0,16$, $p>0,05$.

Table 6 Baseline intergrup comparisons

Intervention vs control	t	df	Sig. (2-tailed)
Postpartum depression	, 914	58	$p>0,05$
Global affective distress	1,871	58	$p>0,05$
Positive emotions	0,686	58	$p>0,05$
Dysfunctional attitudes	-0,157	58	$p>0,05$
Automatic thoughts	1,385	58	$p>0,05$

Post-intervention. Table 7 shows values for t-test intergroup comparisons and Cohen's size effect coefficient. In comparison to the control group, the intervention group has significantly lower scores in postpartum depression proving symptomatology improvement. Also, the significantly lower frequency of automatic thoughts, and lower dysfunctional attitudes scores prove impact on the assumed processes. However, no significant differences were found in global affective distress, $t(58)=0,86$, $p>0,05$, and positive emotions, $(58)=0,78$, $p>0,05$.

Tabelul 7 Postintervention intergrup comparisons

Intervention vs control	t	df	Sig. (2-tailed)	Size effect d (Cohen's coefficient)
Postpartum depression	-4,340	58	p<0,001	-1,122
Global affective distress	0,864	58	p>0,05	0,222
Positive emotions	-0,776	58	p>0,05	-0,200
Dysfunctional attitudes	-2,970	58	p<0,005	-0,766
Automatic thoughts	-2,067	58	p<0,05	-0,533

6.3.2. Intragrup comparisons – progress of the intervention group

Paired samples t test was used to test in the experimental group differences between baseline, mid-treatment, post-treatment and follow-up for depressive symptoms, emotional distress and positive emotions.

Mid-intervention. In the intervention group, significant differences were found between baseline and mid-intervention in postpartum depressive symptomatology, $t(29)=6,28$, $p<0,001$, global affective distress, $t(29)=5,45$, $p<0,001$. No significant differences were found in positive emotions, $t(29)=1,31$, $p>0,05$.

Post-intervention. In the intervention group, significant differences were found between baseline and post-intervention in postpartum depressive symptomatology, $t(29)=12,49$, $p<0,001$, global affective distress, $t(29)=8,67$, $p<0,001$, positive emotions, $t(29)=5,41$, $p<0,001$, automatic thoughts, $t(29)=7,12$, $p<0,001$, and dysfunctional attitudes, $t(29)=9,19$, $p<0,001$. Cohen's d coefficient shows a very strong effect size of the intervention on postpartum depressive symptomatology ($d=1,697$) and on automatic thoughts ($d=1,091$) and a medium effect size for on dysfunctional attitudes ($d=0,626$), global affective distress ($d=0,510$) and positive emotions ($d=0,532$).

Follow-up. In the intervention group, significant differences were found between post-intervention and follow-up in postpartum depressive symptomatology, $t(29)=7,48$, $p<0,001$, global affective distress, $t(29)=4,79$, $p<0,001$, and positive emotions, $t(29)=6,91$, $p<0,001$. Significant differences were found between baseline and follow-up in postpartum depressive symptomatology, $t(29)=14,87$, $p<0,001$, global affective distress, $t(29)=11,98$, $p<0,001$, and positive emotions, $t(29)=11,76$, $p<0,001$. At follow-up, Cohen's d coefficient shows a very strong effect size of the intervention on postpartum depressive symptomatology ($d=2,101$) and on positive emotions ($d=1.064$) and a medium-high effect size on global affective distress ($d=0,711$).

Table 8 Progress of the intervention group (post-intervention – follow-up)

	t	df	Sig. (2-tailed)
Postpartum depression	7,477	29	p<0,001
Global affective distress	4,790	29	p<0,001
Positive emotions	6,915	29	p<0,001

6.4. Conclusions and future directions

The present study showed the development and piloting of a CBT group program adapted to the specific characteristics of postpartum depression. The intervention was superior to control in decreasing postpartum depression symptomatology, automatic thoughts frequency and dysfunctional attitudes level. Although at post-intervention no significant differences were found between the intervention group and the control group in global affective distress and

positive emotions, the follow-up evolution of the intervention group suggests the possibility of superior results. Considering the characteristics of the specific population, follow-up evaluation could not be provided for the control group at one month following treatment, nor for both groups at 3 and 6 months following treatment. Although the intervention's follow-up effect sizes are encouraging, results should be treated carefully considering the lack of follow-up measurements in the control group. Some part of the effect size observed could be accounted by the personal adaptation process to the motherhood stressors and by genuine decrease in postpartum symptomatology levels. Therefore mechanisms of change need further investigation.

Regarding the results of the intervention on global affective distres, enhancing the program with adjunctive modules focused on anxiety/worry, anger and positive emotions is a possible path of further development. Also, taking into account the theme content of dysfunctional thoughts, enhancing the program with adjunctive psychoeducational modules on the baby's development in the first postpartum year is another possible path of development. Further on, developing a screening program and extending the CBT group intervention program to subclinical and nonclinical populations would help mothers to adjust better to motherhood and to cope with maternity challenges and the adjunctive emotional roller coaster.

CHAPTER VII
Conclusions and future directions

7.1. Theoretical, methodological and empirical contributions
Study 1 presented an analysis of the way in which each cognitive theory is represented in the literature on postpartum depression and of cognitive vulnerability assessment.

Two cognitive constructs were tested in relation to postpartum depression: dysfunctional attitudes (Beck's cognitive model of depression, Beck, 1987) and attributional style (reformulated model of learned helplessness, Abramson, Seligman, & Teasdale, 1978 hopelessness theory, Abramson, Metalsky & Alloy, 1989). The two theories of depression are equally represented in the studies reviewed, although previously Swendsen & Mazure (2000) recorded that hopelessness theory (Abramson et al., 1989) was the most investigated stress-vulnerability theory in relation to depression postpartum.

Earlier studies showed promising results for the attributional style (O'Hara et al., 1982; Cutrona, 1983), while the dysfunctional attitudes seemed not to contribute significantly (O'Hara et al., 1982; Gotlib et al., 1991). However, recent studies do not confirm the results for the attributional style (O'Hara et al., 1984; Grazioli & Terry, 2000) and provide evidence for dysfunctional attitudes as predictors for postpartum depression (Grazioli & Terry, 2000; Church et al., 2009; Phillips et al., 2010).

There have been identified a number of strengths and weaknesses of the instruments used in the studies reviewed: cognitive vulnerability assessment tools for depression general lack relevance to postpartum context; the instrument for perinatal specific beliefs, MAQ, does not have a theoretical background; ASQ and REASQ have a moderate internal consistency. Sockol, Epperson & Barber (2014) have identified similar limits for the assessment instruments for maternal attitudes analyzed.

Study 2 brought evidence in favor of a latent cognitive vulnerability for postpartum depression stable over the perinatal period and activated by childbirth and motherhood related stressors.

High levels of postpartum depressive symptoms are associated with a dysfunctional cognitive style reflected in high levels of dysfunctional attitudes and an increased frequency of

negative automatic thoughts. These cognitive factors also impact on global mood and distress, including functional negative emotions and positive emotions. The effect of general cognitive vulnerability (schema, dysfunctional attitudes) on postpartum depressive symptoms is entirely mediated by automatic thoughts and prenatal depressive symptoms. Participants with increased perinatal or postnatal depressive symptoms had, on average, higher levels of dysfunctional attitudes and a higher frequency of automatic thoughts compared to those who had a low perinatal level of depressive symptomatology. There was a significant difference in terms of dysfunctional attitudes among participants with lower levels of depressive symptoms and increased level of depressive symptomatology. These results confirm the pathways of development previously described by Wisner, Moses-Kolko & Sit (2010) for postpartum depression. It seems that these patterns of evolution for depressive symptoms in the perinatal period are associated with latent cognitive vulnerabilities.

Study 3.1. introduced the development of an assessment instrument for maternal attitudes relevant to the postpartum context and based on a theoretical model. Initial results indicate that it may become a valid instrument for assessing individual differences in specific irrational beliefs related to motherhood. Identifying the same methodological shortcoming, Sockol et al. (2014) have developed and validated a similar instrument - Attitudes Toward Motherhood Scale (AToM).

Study 3.2. is among the few in the literature investigating Ellis's model for psychopathology in relation to postpartum depression. In addition, it showed features of cognitive vulnerability for postpartum depression in relation to different types of perceived social support. There are significant differences between women with low depressive symptoms and high depressive symptoms regarding their cognitive style. The latter have higher needs for comfort, achievement, approval, and higher rates of demandingness, self-downing, low frustration tolerance and catastrophizing. Increased levels of postpartum depressive symptoms are associated with higher levels of irrational beliefs and a lower level of perceived social support. A high level of irrational beliefs on approval is related to the reporting low emotional/informational, affective and tangible support. A high level of irrational beliefs on comfort is related to the reporting of a low level of affective and tangible support. A high level of irrational beliefs on achievement is related to low levels of tangible support and low positive social interactions. The relationship between irrational beliefs and the postpartum depressive symptoms is partly mediated by the perceived social support in the postnatal period.

Study 4 introduced the development of a CBT group intervention program for postpartum depression and showed its superiority to the control group in reducing depressive symptoms, dysfunctional attitudes and automatic thoughts. The intervention program had significant post-treatment results and managed to maintain these results and one month following intervention. The evolution of post-treatment intervention group indicates towards possible superior results after 3 months following intervention intervention for depressive symptoms, emotional distress and positive emotions.

7.2. Limits and future directions

The present project is a step forward towards understanding the underlying mechanisms of postpartum depression and towards the development of effective interventions, but the results should be treated with reserve because of the small number of participants in all trials. Population characteristics significantly limited the number of participants in the studies and conducting multiple assessments. However, the option of online evaluation reduced the drop-out rate.

While a number of biological and hormonal factors have been advanced as having a major involvement in postpartum depression, it appears that cognitive vulnerability is a viable research direction. Using longitudinal study designs and further investigation of Ellis's model

of psychopathology in relation to postpartum depression and risk factors are possible future research directions. Developing a screening and intervention program for non-clinical and subclinical symptoms would help mothers to cope better with the challenges of motherhood and with the emotional problems they encounter during this period of their lives.

Keywords: *postpartum depression, cognitive vulnerability, cognitive-behavioural intervention*

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