



Parental competences in fathers and mothers of very-low-birth-weight preterm infants

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Funding information

This paper is part of the project PID2019-110484RB-I00 funded by MCIN/AEI/ 0.13039/501100011033. It was also funded by the 2017 (PI0052/2017) and 2019 (ITI-0019-2019) Cadiz-integrated territorial initiative for biomedical research and the European Regional Development Fund (ERDF) 2014–2020, Andalusian Ministry of Health and Families, Spain.

Abstract

Objective: The goal was to analyze parental competences in Spanish families with very-low-birth-weight infants (≤ 32 weeks and/or less 1500 g) over 18 months of corrected age.

Background: Parenting in families of very preterm infants is an interesting focus of research as we advance in the knowledge of how parental competences can have an important impact on child development.

Method: Sixty-eight mothers and 56 fathers completed measures of parental competences, sociofamily risk, parental stress, social support, and emotional symptoms. Clinical characteristics and neonatal medical risk data were collected after birth. Statistical analyses were performed to compare parental competences with those of mothers and fathers of non-preterm infants. Generalized estimating equations were used for analysis, adjusted by family unit.

Results: Mothers and fathers of preterm infants score higher in most dimensions of parental competences compared to a control group. Focusing on the preterm population, mothers score higher than fathers in daily involvement and mentalization and lower in parental self-care. When studied separately, we found different scores for fathers and mothers in parental competences (sociofamily risk, parental stress, social support, and emotional symptoms).

Conclusion: Parents of preterm infants present better parental competences than parents of non-preterm infants when their children reach 18 months of age. It is important to consider the differences in parental competences between the mothers and fathers of these children.

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Implications: Our findings suggest the need to address parental competences to develop preventive and adaptive strategies in parents of preterm infants to promote positive parenting.

KEYWORDS

fathers and fatherhood, mothers and motherhood, parent–child relationships, parenting and parenthood, parenting infants and toddlers

The great advances in perinatal care in recent years have led to a considerable increase in survival rates of very-low-birth-weight infants (VLBWI). These preterm infants are those born at a gestational age equal to or less than 32 weeks and with a birth weight equal to or under ≤ 1500 g. They are a high-risk population and are likely to have adverse neurodevelopmental outcomes (Ream & Lehwald, 2018). The role of parenting is central to the development of these children and has the potential to buffer the onset of difficulties in their development (McMahon et al., 2022; Vanes et al., 2021), as well as in their brain development even in the presence of brain injury (Treyvaud et al., 2021). Current research is mainly focused on analyzing the influence of parenting on preterm infant development. However, there is a lack of research examining the characteristics of parenting in the long-term outcomes after preterm birth. This work aims to analyze the parental competences of fathers and mothers of VLBWI from the perspective of positive parenting.

Theoretical framework of positive parenting

Positive parenting is an integrative concept related to the protective role of the family for child's well-being and is currently linked to family support measures and policies. The Council of Europe (2006) defined positive parenting as parental behavior based on the best interests and care of the children, developing their capacities, not being violent, and offering recognition and guidance in establishing limits that allow for the children's full development. According to the positive parenting ecological model (Supplemental Figure 1), quality in the task of parenthood depends on three factors, which must be considered as an interactive relationship: (a) the children's needs, (b) the psychosocial context, and (c) parenting skills (Rodrigo et al., 2010).

Positive parenting implies an adequate development of parental competences. The concept of parental competences represents a central and multidimensional concept, and currently there is no consensus regarding its conceptual definition and its components (e.g., Gómez & Contreras, 2019; Rodrigo et al., 2008).

Rodrigo et al. (2008) defined parental competences as a set of skills that enable parents to face their parenting tasks flexibly and adaptively, adjusted to the children's developmental and educational needs and the standards accepted by society. These competences are structured in five categories: educative, personal agency, autonomy and personal development, personal life, and house organization.

Gómez & Contreras (2019) proposed an updated definition of parental competences, which refers to knowledge, attitudes, and parental practices that are learned and updated from history and from the opportunities offered through ecological parenting. It allows parents to organize their own experience and to guide the parental behavior through several situations of family life and upbringing. These competences accompany, protect, and promote positive development in children, ensuring their well-being and the full exercise of their human rights. The definition recognizes four areas of parental competence (linking, formative, protective, and reflective), with

various components that interconnect through complex and dynamic forms mutually influenced (Gómez & Contreras, 2019; Muñoz, 2020).

The literature on parental competences also includes a wide variety of studies related to the perceived sense of parental competence. This construct refers to the way in which men and women experience their role as parents, and helps in the complete understanding of the family system (Menéndez et al., 2011). There is also no general agreement regarding its components, although most studies report two main components: perceived efficacy (or self-efficacy) as parents (hereinafter referred to as efficacy), and satisfaction (Rodrigo et al., 2008), related to the most widely used scale to assess the sense of parental competence (Parental Sense of Competence Scale; Johnston & Mash, 1989). Other studies also consider a third component referred to as the controllability of the educational task (Menéndez et al., 2011).

Positive parenting in families with VLBWI

Parenthood involves changes and redefinitions in the lives of men and women, and adapting to this new role of fathers and mothers can be complicated (Oronoz et al., 2007). According to the first factor to the positive parenting ecological model, needs of the child, some factors such as being under 3 years of age, the presence of complications at birth (including prematurity), or perinatal morbidities may require specific attention or care for the children and therefore, require an adjustment in the parenting practices (Rodrigo et al., 2010).

Parents of VLBWI face several challenges in the care of their children due to health problems associated with preterm birth, and they report feelings of incompetence when their children leave the hospital (Twohig et al., 2016). Studies of mother–preterm infant interactions showed differences within the first 6 months of life with mothers of full-term infants, with greater difficulty in acquiring feelings of perceived efficacy and mastery in their parental competences (Korja et al., 2012; Pennell et al., 2012).

Some parents perceive their preterm infants as special and vulnerable because of their painful experiences during the neonatal intensive care unit (NICU) admission. These experiences lead to “compensatory parenting,” implying overprotection, which can be maintained over time and is evident even at 3 years of age (Miles & Holditch-Davis, 1995). Parents’ perception of their child as vulnerable can have negative effects on how they exercise their parenting. Gordo et al. (2018) found a relationship between children’s perceived vulnerability and a lower perception of parental competence in a sample of fathers and mothers of full-term infants (aged 6 to 8 months). However, this association was only seen in mothers and seemed to be mediated by symptoms of depression and stress. Nevertheless, other studies found no differences between the parenting style of parents of children born with and without high risk (Rangarajan et al., 2020). Also, Pennell et al. (2012) found no significant differences in the parental self-efficacy of parents of preterm infants at 14 months of corrected age, which was similar to that of parents of term infants.

Second, the psychosocial context includes those conditions of the family environment that may pose a risk or be protective for its proper family functioning (Garbarino & Ganzel, 2000). Whereas risk factors would make it more difficult (e.g., unemployment or chronic poverty, low education level of the mother, parents with mental illness, among others), protective factors would provide resources and skills to the family and parents to face such stressors (e.g., parental emotional stability or positive relations with the extended family, among others; Rodrigo et al., 2010).

Parents with low levels of education or with economic problems may face challenges that compromise their parental self-efficacy and, therefore, parental competences may also be compromised (COPMI, 2021). Kalil and Ryan (2020) examined the relationship between parenting practices and socioeconomic gaps in children’s outcomes. They showed how parents with higher

levels of education and higher incomes provided better cognitive stimulation to their children, interacted with more emotional warmth, and used less harsh discipline compared to parents with lower levels of education and income.

In studies involving the preterm population, the results are inconclusive. Mothers' employment seems to be a protective factor for the quality of life of the preterm infant, promoting more positive experiences in these children. Increased income allows greater access to resources and higher self-esteem in the mother (Roggman et al., 2008). This allows parents with higher educational levels to benefit to a greater extent from preventive intervention programs (Roggman et al., 2008) and be more aware of the risks associated with preterm birth, which favors a better learning environment (Winter et al., 2018), which, in turn, favors the long-term cognitive outcome of preterm infants even in the presence of brain injury (Benavente-Fernández et al., 2019). Akkus et al. (2020) found that higher socioeconomic status (in part represented by the maternal level of education) and higher gestational age were the strongest predictors of maternal sensitivity.

Nevertheless, mothers of preterm infants are often more exposed to economic difficulties related to leaving their jobs or working less time as they dedicate more time to the care of their children than other members of the family, with frequent visits to the hospital required for different controls or follow-ups (Cronin et al., 1995). In contrast, Martini et al. (2016) associated maternal employment with less time dedicated to children and, therefore, a decrease in the quality of care and stimulation.

On the other hand, other variables such as maternal age are also linked with parenting practices linearly, that is, such that each additional year of life experience begets greater parenting knowledge and maturity (Bornstein et al., 2015). There is less empirical evidence of other psychosocial factors associated with preterm birth, such as family structure or language spoken at home, and their relationship to parenting. Previous literature recognizes that different family configurations coexist in the exercise of parenthood, as well as the importance of their evaluation. Single parenthood is considered a risk factor that, together with other factors, increases the probability of risk in the development of their children (Rodríguez et al., 2006). Previous studies with non-preterm families have found higher levels of parental stress in single-parent mothers (Olhaberry & Farkas, 2012). Finally, it is important to consider language diversity, which was initially considered a limitation due to the reluctance of participants in parenting programs (Amorós et al., 2015).

Last, the presence of psychosocial stressors could also imply the onset of symptomatology in the parents, which could, in turn, have an impact on their parenting skills (Rodrigo et al., 2010). In this sense, preterm birth itself is considered a stress factor (Perricone et al., 2014). Moreover, it is important to consider the heterogeneity of mothers' emotional responsiveness, which is also influenced by other psychosocial and socioeconomic risk factors.

Preterm birth has been recognized as a risk factor for perinatal depression, with consequences for parenting and child development. Families, especially mothers, experience postpartum distress, although this does not necessarily imply poor adaptation in the mother-child relationship or suboptimal parenting (Hall et al., 2017). The higher risk of depression in the first trimester after delivery has been demonstrated in cases of extreme prematurity in both mothers and fathers, although improvement was achieved over time (Genova et al., 2022). Petersen & Quinlivan (2021) have shown that fathers of preterm babies are more likely to report symptoms of anxiety than parents of full-term infants. Recently, Adil et al. (2021) described the importance of the role of parental competences of mothers in reducing the likelihood of postpartum depression through the regulation of negative thoughts. Furthermore, Pennell et al. (2012) found that the presence of psychological symptoms (depression, anxiety, and stress) in mothers and fathers of preterm infants is a significant predictor of self-perceived parental competence when performing parenting tasks.

Additionally, social support is considered a protective factor for the exercise of positive parenting, which also helps to eliminate social inequalities. Social support can be informal (such as family, friends, neighbors, or support organizations) or formal, from specialized professionals. In this sense, the lack or decompensation of social support (formal and informal) often reduces the feelings of parental competence (Rodrigo et al., 2010).

Perricone et al. (2014) analyzed coping strategies (social support, among others) in mothers of moderately and extremely preterm children. Their results did not show differences between the two groups in coping strategies and maternal self-perceived competence. Fathers of preterm infants express more social support needs associated with informational, belonging, and emotional supports (Kim, 2018), although these results have not yet been related to their parental characteristics.

Parental competences and parents' gender

Finally, it is important to take into account that gender could be a determinant for parenting development. Most of the research in preterm population has focused mainly on the study of maternal competence (Boyce et al., 2015; Perricone et al., 2014), specifically on maternal sensitivity after the child's hospital discharge (Bilgin & Wolke, 2015). Results show that mothers' sensitivity seems to improve when they cooperate in the child's development as they grow older (Boyce et al., 2015).

Other studies not focused on preterm population show that fathers' involvement has increased in recent years (Dominguez-Folgueras et al., 2018), although the Spanish population still continues to perceive differentiated social images of motherhood and fatherhood (García-de-Diego & García-Faroldi, 2022). Although some recent research shows similarities in the parenting behaviors of mothers and fathers (Rivero et al., 2022), differences are also found. Mothers dedicate more time to childcare, perform more routine parental tasks (Borrás et al., 2021), and are more sensitive (Hallers-Haalboom et al., 2014), whereas fathers perform more rewarding and socially valued activities (García-de-Diego & García-Faroldi, 2022). Results of recent research indicates greater communicative competence in mothers than fathers in relating to their adolescent children, but mothers self-rate themselves as less skilled than fathers in emotional self-control (Martínez González et al., 2021). Despite these evidences, the studies carried out so far do not allow us to know if these differences between mothers and fathers also exist in families with preterm-born children, this analysis being one of the objectives of our work.

Current study

The aim of this paper is to analyze parental competences in families with children aged 18 months corrected age who were VLBWI. Specifically, this work presents the following objectives: (a) to analyze the parental competences and their perception of their parental role (efficacy and satisfaction) in families with children born prematurely compared to parents of non-preterm infants (comparison group), (b) to describe the differences between fathers and mothers in parental competences and their perception of the parental role (efficacy and satisfaction), and (c) to determine the factors that could predict parental competences and the perception of the parental role (efficacy and satisfaction) in fathers and mothers.

As hypothesized outcomes for this paper, and based on previous research, we expected that families with children born prematurely will require a greater deployment of parenting competences and parental adjustment related to parenting. Specifically, the hypotheses related to the objectives presented for this paper are the following: (H1) Parents with children born

prematurely will present higher scores on parental competences and perception of their parental role, compared to parents with non-preterm children. (H2) Mothers will show higher scores in parental competences and perception of their parental role than fathers. (H3) Factors related to child characteristics at birth (neonatal medical risk) and to the psychosocial context (socio-family risk, parental stress, social support, and emotional symptoms such as depression, anxiety, or stress) will be related to the development of parental competences and the perception of the parental role.

METHOD

Participants

This study is part of a prospective longitudinal cohort study that includes VLBWI born at the Puerta del Mar Hospital, Cádiz, Spain, as of May 2018 with recruitment still ongoing (PI0052/2017, ITI-0019-2019 and PID2019-110484RB-I00). We aim to investigate brain growth trajectory in the neonatal period in VLBWI related to the potential factors that could impact brain development and long-term outcome. We consecutively enrolled VLBWI who met inclusion criteria (weight at birth equal to or < 1500 grams, gestational age at birth equal to or < 32 weeks of gestation). Exclusion criteria consisted of congenital and chromosomal anomalies, metabolic disorders, and central nervous system infections.

During the recruitment period, 113 families met the inclusion criteria. Of these, 67 (59.2%) participated in the current study (see Supplemental Figure 2). In 57 families both parents participated, in eight families only the mother ($n = 7$) or father ($n = 1$) collaborated and two were single-parent families (mothers). Specifically, 124 parents (68 mothers and 56 fathers) participated. Table 1 summarizes the characteristics of the studied population.

Regarding comparison group, the inclusion criteria for the selection of the sample were (a) to have children aged 0 to 3 years, (b) to have Spanish as native language or as the language spoken at home, and (c) to have full-term children. We recruited 942 parents, 841 mothers and 101 fathers (Supplemental Table 1 presents the characteristics of the sample).

Measures

Family Sociodemographic Questionnaire

This questionnaire was developed to collect demographic information, social risk, and pregnancy-related characteristics.

Neonatal medical risk index

This index was developed following other composite medical risk scales (see Lundquist et al., 2013; Yaari et al., 2019) and considers six comorbidities during neonatal admission: (a) necrotizing enterocolitis: confirmed necrotizing enterocolitis (Bell Stage II or higher); (b) moderate to severe bronchopulmonary dysplasia: oxygen requirements at 36 weeks post-menstrual age; (c) significant patent ductus arteriosus: patent ductus arteriosus requiring surgical or pharmacological closure; (d) severe retinopathy of prematurity: retinal vasculopathy Stage 3 or higher; (e) severe brain injury: Grade 3 intraventricular hemorrhage, parenchymal hemorrhagic infarction, and/or moderate to severe white matter injury; and (f) late-onset sepsis: systemic signs of infection and isolation of a bacterial pathogen in blood culture after 5 days of

TABLE 1 Parents' and children's characteristics

	Total sample	Mothers (<i>n</i> = 68)	Fathers (<i>n</i> = 56)
Children (<i>n</i> = 82)			
Gestational age (weeks) ^a	29.07 (2.13)		
Corrected age (months) ^a	21.37 (4.28)		
Chronological age (months) ^a	23.84 (4.28)		
Birth weight (g) ^a	1137.74 (345.98)		
Female ^b	44 (53.7)		
SGA ^b	14 (17.1)		
Multiple birth ^b	35 (42.7)		
IVF ^b	16 (19.5)		
Caesarean sections ^b	18 (22)		
Apgar score 1 min ^c	6 [1–9]		
Apgar score 5 min ^c	8 [2–10]		
NEC ^b	1 (1.2)		
DBP ^b	16 (20)		
PDA ^b	11 (13.4)		
ROP Grade 3+ ^b	6 (7.31)		
Severe brain injury ^b	5 (6.1)		
Late-onset sepsis ^b	13 (15.9)		
Child's neonatal medical risk ^d	0.71 (1.30)		
Parents (<i>n</i> = 124)			
Family economic income ^b			
≥ 1801€	27 (32.9)		
901€–1800€	42 (51.2)		
< 900€	13 (15.9)		
Language spoken at home ^b			
Spanish only	74 (90.2)		
Some Spanish	7 (8.5)		
No Spanish	1 (1.2)		
Family structure ^b			
Nuclear	66 (80.5)		
Reconstituted family	13 (15.9)		
Single caregiver	3 (3.7)		
Educational level ^b			
Tertiary educated (>12 years)	72 (58.1)	43 (63.2)	29 (51.8)
11–12 years formal schooling	31 (25.0)	14 (20.6)	17 (30.4)
< 11 years formal schooling	21 (16.9)	11 (16.2)	10 (17.9)
Labor situation ^b			
Employed	86 (69.4)	35 (51.5)	51 (91.1)
Unemployed/pensioned	38 (30.6)	33 (48.6)	5 (8.9)
Age (years) ^a	36.08 (6.86)	35.00 (6.18)	37.39 (7.44)
Maternal age at birth (years) ^a		32.35 (6.29)	
Sociofamily risk index ^a	1.84 (1.51)		

Note. DBP = moderate to severe broncho pulmonary dysplasia; IVF = in vitro fertilization; NEC = necrotizing enterocolitis; PDA = significant patent ductus arteriosus; ROP = severe retinopathy of prematurity; SGA = small for gestational age.

^aMean (*SD*).

^b*n* (percent).

^cMedian [interquartile range].

life. The presence of comorbidities was scored with 1 and absence was scored with 0. The index is the sum of the comorbidities for each patient, with a total score ranging from 0 to 6.

Sociofamily risk index

Based on previous studies (Pennell et al., 2012; Treyvaud et al., 2012; Yaari et al., 2019), we considered a composite measure with six family and social factors: family structure (0 = two caregivers (nuclear), 1 = reconstituted family or parents with dual custody, 2 = single caregiver or sole custody), education of primary caregiver (0 = tertiary educated or more than 12 years of education, 1 = 11–12 years of formal schooling, 2 = less than 11 years of formal schooling), employment status of both caregivers (0 = full-time employment, 1 = part-time employment, 2 = unemployment/pension), income earned (0 = more than 1,801€, 1 = 901–1,800€, 2 = less than 900), language spoken at home (0 = Spanish only, 1 = some Spanish, 2 = no Spanish), maternal age when the child was born (0 = above 21 years, 1 = 18–21 years, 2 = less than 18 years). Each domain was scored on a 3-point scale, where 0 represented the lowest risk and 2 represented the highest risk, summed to provide a total score ranging from 0 to 12.

Scale Positive Parental Practices of the Caregiver (SP + C) in the 0 to 3 years version (Muñoz, 2020).

We used the Spanish adaptation by Jiménez-Luque & Sánchez-Sandoval (2021). This scale assesses the parental competences of parents of young children. It is composed of 27 items and seven subscales (Daily Involvement, Mentalization, Sensitivity, Promoting Learning, Attention and Organization of Daily Life, Monitoring of Parental Activity, and Parental Self-Care; see definitions in Supplemental Table 2). Each item is rated on a 4-point Likert scale (1 = *hardly ever*, 2 = *sometimes*, 3 = *almost always*, 4 = *always*). The Cronbach alpha was .93 (α for comparison group in Supplemental Table 3).

Parental Sense of Competence Scale

The Parental Sense of Competence Scale (PSOC) by Johnston and Mash (1989) was translated into Spanish by Menéndez et al. (2011). This scale evaluates the parents' perception of their parental abilities or the perceived parenting competence. Specifically, two measures are offered: perceived Efficacy as a parent and Satisfaction. This 16-item self-report is rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The Cronbach alpha was .76 for the Efficacy scale and .69 for the Satisfaction scale (α for comparison group in Supplemental Table 3).

Parental Stress Scale by Berry and Jones (1995)

We used the Spanish version of the Parental Stress Scale (PSS; Oronoz et al., 2007). This scale assesses the stress levels suffered by parents as a consequence of their parental role. It is composed of 12 items rated on a 5-point Likert scale. A higher score indicates a higher level of parental stress. The Cronbach alpha was .84.

The Duke–UNC Functional Social Support Questionnaire

We used the Spanish version of the Duke–UNC Functional Social Support Questionnaire (Duke UNC-11; Broadhead et al., 1988) adapted and validated by De la Revilla et al. (1991).

Social support was measured using 11 items rated on a 5-point Likert scale. This questionnaire assesses the level of perceived social support in its affective and confidant dimensions. The affective support dimension evaluates expressions of love, affection, esteem, sympathy, and/or group membership. The confidant support dimension assesses whether people can receive information, advice, or guidance, or have people with whom they can share their concerns or problems. A higher score indicates a higher level of social support. In this study, we used the total score ($\alpha = .90$).

Emotional symptoms

The Depression, Anxiety and Stress Scales (DASS) in its short form (DASS-21; Lovibond & Lovibond, 1995) was used in the version translated and validated in Spain (Bados et al., 2005). Respondents rate from 0 to 3 the severity or frequency with which they have experienced each of the 21 negative emotional symptoms during the previous week. There are three 7-item scales: Depression ($\alpha = .76$), Anxiety ($\alpha = .70$), and Stress ($\alpha = .86$).

Procedure

Parents completed the Family Sociodemographic Questionnaire at their child's birth. Families were contacted again when their children had reached 18 months of corrected age from the Hospital Puerta del Mar, Cádiz. Participants were requested via phone and/or email to access and complete a survey online with the study questionnaires. Clinical variables were prospectively collected as these patients were recruited since birth in this longitudinal study.

The comparison group (parents with non-preterm infants) were recruited through an online survey in Spain. Participation was voluntary and all responses were anonymous. An online form was prepared that collected the information about (a) sociodemographic characteristics of the participants and characteristics of their children, and (b) measures about parental competences (SP + C) and their perception of their parental role (PSOC).

This study was approved by the Biomedical Research Ethics Committee of Cádiz, Andalusia, Spain, and all procedures were performed following the ethical standards of the institution. We obtained informed written consent from the parents.

Statistical analyses

We performed a descriptive analysis of the studied variables. Absolute and relative frequencies are reported for qualitative variables, and quantitative variables are expressed as mean and standard deviation or median and interquartile range according to the variable's distribution. U de Mann–Whitney and chi-square test were performed to analyze whether there were significant differences with respect to the demographic characteristics of the comparison group and the sample of the study (Supplemental Table 1).

Wilcoxon signed-rank test was used to compare the medians of the SP + C and PSOC scale and subscale scores of mothers and fathers of preterm infants with mothers and fathers of non-preterm infants. Paired-samples Wilcoxon tests were used to determine the median scores of mothers and fathers of preterm infants (when both parents participated). Families with two parents of the same gender were excluded from this analysis (mother–mother).

Nonparametric correlation estimators, such as Spearman's rho were used to analyze the correlations between the SP + C and PSOC scale and subscale scores and the quantitative variables. Last, we adjusted the analysis by family unit using generalized estimating equations

(GEE) accounting for twin pairs and parents belonging to the same family. We performed stepwise multiple analysis, by gender, to study the association of the specified variables with SP + C total score and the perception of Efficacy and Satisfaction (PSOC) as parents. When possible, we compared the obtained models for fathers and mothers. Statistical analyses were performed using IBM SPSS Statistics (Version 21). A result was considered statistically significant at $p < .05$.

RESULTS

Analysis of parental competences in families with children born preterm

No statistically significant differences were found with respect to the demographic characteristics between mothers and fathers of preterm infants and mothers and fathers of the comparison group, respectively (Supplemental Table 1). The first analysis compared the median of the SP + C and PSOC scale and subscale scores of mothers and fathers of preterm infants with the median score of the scale and subscales in mothers and fathers of non-preterm infants, respectively. The median scores of mothers and fathers were also compared (Table 2).

Mothers of preterm infants scored significantly higher than mothers in the comparison group in all dimensions of parental competences (except for Daily Involvement), and on Efficacy and Satisfaction. Fathers of preterm infants scored significantly higher than fathers of the comparison group in all dimensions of parental competences (except for Daily Involvement) and on Efficacy, but not for Satisfaction.

We found that mothers of preterm infants had higher scores than fathers in Daily Involvement ($p < .01$) and Mentalization ($p < .01$). Mothers scored lower in Parental Self-Care ($p = .01$). According to their perceived parental competence, fathers had higher scores than mothers in Satisfaction, albeit not reaching statistical significance ($p = .05$). There were no significant differences in Efficacy.

Parental competences and sociofamily risk index, neonatal medical risk index, and other family variables

We then studied the association between the SP + C and PSOC scores, sociofamily risk index, neonatal medical risk index, and family variables (parental stress, social support, and emotional symptoms). Supplemental Table 4 presents the results for mothers. We found sociofamily risk to be positively correlated to some dimensions of parental competences such as the SP + C total score ($r = .337$), Daily Involvement ($r = .235$), Mentalization ($r = .296$), Sensitivity ($r = .399$), Promoting Learning ($r = .297$), Monitoring of Parental Activity ($r = .224$), and Efficacy ($r = .363$). We found no association between medical risk index and parental competences scores. The SP + C total score ($r = -.405$), Daily Involvement ($r = -.256$), Mentalization ($r = -.288$), Sensitivity ($r = -.286$), Parental Self-Care ($r = -.521$), Efficacy ($r = -.526$), and Satisfaction ($r = -.725$) correlated negatively with parental stress. The SP + C total score ($r = .325$), Attention and Organization of Daily Life ($r = .380$), Parental Self-Care ($r = .479$), and Satisfaction ($r = .459$) were positively correlated with social support. Emotional symptoms (depression, anxiety, and stress) correlated negatively with satisfaction ($r = -.444$, $-.367$, $-.549$, respectively). Other subscales also correlated with some emotional symptoms (see details in Supplemental Table 4).

Supplemental Table 5 shows the results of the analysis for fathers. There was no significant association between neonatal medical and sociofamily risk with fathers' scoring on the parental competences scales, except the association between sociofamily risk and Efficacy ($r = .263$). All

TABLE 2 Comparison of SP + C and PSOC scores with comparison group

	Mothers in the comparison group ^a (n = 841)	Mothers of premature infants ^a (n = 68)	Fathers in the comparison group ^a (n = 101)	Fathers of premature infants ^a (n = 56)	Mothers of premature infants ^a (n = 55)	Fathers of premature infants ^a (n = 55)	p ³
Total score SP + C	3.26 [2.07, 4.00]	3.50 [2.74, 4.00]	3.07 [2.11, 3.85]	3.44 [1.96, 4.00]	3.40 [2.74, 4.00]	3.44 [1.96, 4.00]	.120
Daily Involvement	3.67 [1.33, 4.00]	3.83 [2.33, 4.00]	3.67 [1.67, 4.00]	3.33 [1.67, 4.00]	3.66 [2.33, 4.00]	3.33 [1.67, 4.00]	.005
Mentalization	3.50 [2.00, 4.00]	3.75 [2.75, 4.00]	3.00 [2.00, 4.00]	3.50 [1.75, 4.00]	3.75 [2.75, 4.00]	3.50 [1.75, 4.00]	.004
Sensitivity	3.33 [1.67, 4.00]	3.67 [2.33, 4.00]	3.00 [2.00, 4.00]	3.67 [2.00, 4.00]	3.67 [2.33, 4.00]	3.67 [2.00, 4.00]	.436
Promoting Learning	3.40 [1.00, 4.00]	3.80 [2.40, 4.00]	3.40 [1.20, 4.00]	3.60 [1.40, 4.00]	3.80 [2.40, 4.00]	3.60 [1.40, 4.00]	.138
Attention and Organization of Daily Life	3.50 [1.75, 4.00]	3.75 [2.75, 4.00]	3.25 [1.75, 4.00]	3.75 [2.00, 4.00]	3.75 [2.75, 4.00]	3.75 [2.00, 4.00]	.253
Monitoring of Parental Activity	3.40 [1.40, 4.00]	3.60 [2.20, 4.00]	3.20 [1.80, 4.00]	3.60 [1.80, 4.00]	3.60 [2.20, 4.00]	3.60 [1.80, 4.00]	.488
Parental Self-Care	2.00 [1.00, 4.00]	2.33 [1.00, 4.00]	2.33 [1.00, 4.00]	2.67 [1.00, 4.00]	2.33 [1.00, 4.00]	2.67 [1.00, 4.00]	.010
Efficacy	22.00 [6.00, 35.00]	27.50 [13.00, 36.00]	22.00 [9.00, 34.00]	27.00 [15.00, 36.00]	27.00 [14.00, 36.00]	27.00 [15.00, 36.00]	.314
Satisfaction	38.00 [9.00, 54.00]	39.00 [22.00, 52.00]	40.00 [25.00, 54.00]	42.00 [23.00, 53.00]	40.00 [22.00, 52.00]	42.00 [23.00, 53.00]	.058

Note. p¹ and p² = Comparison median of mothers/fathers of preterm infants with the median of mothers/fathers comparison group; p³ = Comparison of scores of mothers and fathers of preterm infants; PSOC = Parental Sense of Competence Scale; SP + C = Scale Positive Parental Practices of the Caregiver.

^aMedian score [range].

the parental competences subscales correlated with parental stress (negatively) and with most of the social support items (positively), except for Promoting Learning. Finally, we found a negative association between emotional symptoms (depression, anxiety, and stress) and Parental Self-Care ($r = -.249, -.404, -.371$, respectively) and Satisfaction ($r = -.286, -.438, -.442$, respectively). The SP + C total score, Daily Involvement, Sensitivity, Attention and Organization of Daily Life, Monitoring of Parental Activity, and Efficacy also correlated with some emotional symptoms (see details in Supplemental Table 5).

GEE models were applied to determine whether the specified variables were related to parental competences in fathers and mothers. The first model was performed for the total score of SP + C including those dimensions that showed significant differences between fathers and mothers (Daily Involvement, Mentalization, and Parental Self-Care). Additionally, we performed GEE to study those factors associated with the Efficacy and Satisfaction scales.

Sociofamily risk index ($\beta = .04, p = .01$), parental stress ($\beta = -.01, p < .01$), and social support ($\beta = .01, p = .01$) were associated with SP + C total score in mothers. For fathers, the best predictor variables for the SP + C total score were social support ($\beta = .03, p < .01$) and parental stress ($\beta = -.02, p = .01$; Table 3).

Regarding the SP + C subscales (Table 3), the predictor variable for Daily Involvement in mothers was parental stress ($\beta = -.01, p = .04$), whereas social support ($\beta = .04; p < .01$) was found to be related in fathers. Mentalization was predicted by sociofamily risk ($\beta = .04, p < .05$) and parental stress ($\beta = -.02, p < .01$) in mothers, whereas in fathers, only social support ($\beta = .04, p < .01$) was relevant. Parental Self-Care was predicted by parental stress ($\beta = -.06, p < .01$ for mothers; $\beta = -.05, p < .01$ for fathers) and social support ($\beta = .02, p = .02$ for mothers; $\beta = .03, p < .01$ for fathers) both in mothers and fathers. We found statistically significant differences between mothers and fathers ($p < .01$) in predicted total SP + C score, Daily Involvement, Mentalization, and Parental Self-Care.

Considering Efficacy and Satisfaction (Table 4), sociofamily risk ($\beta = .99, p < .01$), parental stress ($\beta = -.25, p < .01$), and stress symptoms ($\beta = -.33, p = .03$) were associated in mothers with Efficacy. Satisfaction was predicted by parental stress ($\beta = -.55, p < .01$) and social support ($\beta = .12, p = .02$). In turn, only parental stress ($\beta = -.36, p < .01$) predicted Efficacy in fathers. Last, parental stress ($\beta = -.54, p < .01$) and anxiety symptoms ($\beta = -1.15, p < .01$) explained part of the variance of parental satisfaction. We found statistically significant differences between mothers and fathers in Efficacy ($p < .01$) and Satisfaction ($p < .01$).

DISCUSSION

The present study sought to provide empirical evidence of parental competences in families with very preterm infants. The aim was to analyze whether parental competences in these families were different from those of the mothers and fathers of non-preterm infants and to determine possible differences between fathers and mothers of the sample, as well as to analyze those variables that better explain parenting in these parents. The results showed differences in some competences compared to the mothers and fathers of non-preterm infants and between mothers and fathers of our sample of preterm children. Finally, regression models fitted by family unit were presented for mothers and fathers independently analyzing the predictor variables for each of them.

In relation to the first aim of this research, we found that mothers and fathers with VLBWI, when assessed at 18 months of age of their children, present better parental competences than their comparison group. These results seem to contrast with those obtained by other groups such as Pennell et al. (2012), who found no significant differences in perceived efficacy between parents of preterm and full-term infants, although parental competences in their study were evaluated at an earlier stage, with the infants being on average 8 months younger than those in

TABLE 3 Predictor variables of parental competences of mothers and fathers

	Regression coefficient (95% CI)	<i>p</i> ₁	GEE model parameters	Predicted scores (95% CI)	Diff <i>p</i> ₂ (95% CI)
Total score SP + C					
Mothers					
Sociofamily risk	0.04 [0.08, 0.07]	.015	Number of obs. = 68	3.49 [3.46, 3.52]	0.20 [0.16, 0.23]; <i>p</i> < .01
Parental stress	-0.01 [-0.02, -0.01]	.001	Number of groups = 66		
Social support	0.01 [0.00, 0.02]	.013	Wald $\chi^2(3) = 31.01$ <i>p</i> = .0001		
Fathers					
Social support	0.03 [0.01, 0.04]	.001	Number of obs. = 56	3.30 [3.24, 3.35]	
Parental stress	-0.02 [-0.04, 0.00]	.013	Number of groups = 56		
			Wald $\chi^2(2) = 31.63$ <i>p</i> = .0001		
Daily Involvement					
Mothers					
Sociofamily risk	0.04 [-0.01, 0.09]	.105	Number of obs. = 68	3.49 [3.46, 3.52]	0.19 [0.15, 0.23] <i>p</i> < .01
Parental stress	-0.01 [-0.03, 0.00]	.036	Number of groups = 66		
			Wald $\chi^2(3) = 7.71$ <i>p</i> = .021		
Fathers					
Social support	0.04 [0.02, 0.06]	<.001	Number of obs. = 56	3.30 [3.25, 3.36]	
			Number of groups = 56		
			Wald $\chi^2(1) = 18.83$ <i>p</i> = .0001		
Mentalization					
Mothers					
Sociofamily risk	0.04 [0.00, 0.09]	.049	Number of obs. = 68	3.65 [3.62, 3.67]	0.33 [0.28, 0.39] <i>p</i> < .01
Parental stress	-0.02 [-0.03, 0.00]	.004	Number of groups = 66		
			Wald $\chi^2(2) = 13.05$ <i>p</i> = .002		

(Continues)

TABLE 3 (Continued)

	Regression coefficient (95% CI)	p_1	GEE model parameters	Predicted scores (95% CI)	Diff p_2 (95% CI)
Fathers					
Social support	0.04 [0.02, 0.05]	<.001	Number of obs. = 56 Number of groups = 56 Wald $\chi^2(1) = 16.44$ $p = .0001$	3.31 [3.26, 3.36]	
Parental Self-Care					
Mothers					
Parental stress	-0.06 [-0.08, -0.03]	<.001	Number of obs. = 68 Number of groups = 66	2.52 [2.44, 2.60]	-0.16 [-0.18, -0.15]
Social support	0.02 [0.00, 0.04]	.020	Wald $\chi^2(2) = 41.58$ $p = .0001$		$p < .01$
Fathers					
Parental stress	-0.05 [-0.07, -0.02]	<.001	Number of obs. = 56 Number of groups = 56	2.68 [2.60, 2.77]	
Social support	0.03 [0.01, 0.05]	.004	Wald $\chi^2(2) = 36.95$ $p = .0001$		

Note. This table reports statistically significant predictors ($p < .05$). CI = confidence interval; GEE = generalized estimating equations; $p_1 = p$ value for each independent variable; $p_2 = p$ value for the comparison between the predicted maternal and paternal scores based on the reported models; SP + C = Scale Positive Parental Practices of the Caregiver.

TABLE 4 Predictor variables of efficacy and satisfaction

	Regression coefficient (95% CI)	p_1	GEE model parameters	Predicted scores (95% CI)	Diff p_2 (95% CI)
Efficacy					
Mothers					
Sociofamily risk	0.99 [0.49, 1.49]	<.001	Number of obs. = 68 Number of groups = 66	26.95 [26.41, 27.50]	0.95 [0.62, 1.28] $p < .01$
Parental stress	-0.25 [-0.39, -0.10]	.001	Wald $\chi^2(3) = 50.20$ $p = .0001$		
Stress	-0.33 [-0.63, -0.03]	.031			
Fathers					
Parental stress	-0.36 [-0.53, 0.20]	<.001	Number of obs. = 56 Number of groups = 56	26.00 [25.57, 26.43]	
			Wald $\chi^2(2) = 18.39$ $p = .0001$		
Satisfaction					
Mothers					
Parental stress	-0.55 [-0.68, -0.42]	<.001	Number of obs. = 68 Number of groups = 66	40.13 [39.41, 40.85]	-0.25 [-0.43, -0.07] $p < .01$
Social support	0.12 [0.02, 0.22]	.024	Wald $\chi^2(2) = 95.26$ $p = .0001$		
Fathers					
Parental stress	-0.54 [-0.74, -0.3]	<.001	Number of obs. = 56 Number of groups = 56	40.38 [39.58, 41.17]	
Anxiety	-1.15 [-2.00, -0.30]	.008	Wald $\chi^2(2) = 60.91$ $p = .0001$		

Note. This table only reports statistically significant predictors ($p < .05$). CI = confidence interval; GEE = generalized estimating equations; $p_1 = p$ value for each independent variable; $p_2 = p$ value for the comparison between the predicted maternal and paternal scores based on the reported models.

our sample. Moreover, our study includes a larger sample size ($N = 124$ vs. $N = 83$). Whereas parents reported negative feelings about their perceived competences upon hospitalization and after hospital discharge (Perricone et al., 2014; Polizzi et al., 2021; Twohig et al., 2016), as these children grow older, these differences are not as evident (Neri et al., 2017; Pennell et al., 2012). These results suggest that specific education and training in the acquisition of skills related to the care of preterm infants, as well as coping strategies, might improve long-term parenting outcomes for these parents (Perricone et al., 2014).

The second hypothesis according to which mothers would obtain higher scores than fathers was partially confirmed. Our findings confirmed better parental competences in mothers in Daily Involvement and Mentalization. However, there were no differences for the other subscales. Higher scores were observed in fathers in Parental Self-Care and Satisfaction. These results are consistent with previous research in a Spanish non-premature sample using the same research methodology (Rivero et al., 2022). Our study provides an innovative approach to parents of preterm infants, as we considered the two parents separately, adjusting for the family unit when comparing their parental characteristics and differentiating their gender in subsequent analyses. Most studies do not take into account that they are from the same family unit (Gordo et al., 2018) and do not usually differentiate gender in their analyses (Pennell et al., 2012), even excluding fathers from these analyses (Neri et al., 2017; Perricone et al., 2014; Polizzi et al., 2021).

The mothers' greater involvement and mentalization could be related to a greater assumption of the degree of responsibility and care for the children, whereas the father focuses mainly on obtaining economic resources to contribute to the maintenance of the household (Macedo & Alzás, 2014). The reduction of out-of-home work hours for these mothers would mean lower fathers' involvement in all childcare tasks, as previous research has shown (Gaunt, 2005). Most of the fathers in this study were working (90%), confirming that they were mainly responsible for the family income, thus having less time for dedication and daily involvement in the upbringing of their children. In the mothers, only 50% worked, so they could have more time to dedicate to their maternal role.

There is no previous reference about the possible impact of fathers scoring higher than mothers on Parental Self-Care and Satisfaction. This study shows the presence of traditional roles associated with parenthood and motherhood in these families, where mothers are more involved in child-rearing tasks (Borràs et al., 2021) and less involved in self-care compared to their partners. Further research should be carried out to corroborate the findings of this study.

The results obtained in this research partially confirm our third hypothesis, showing a relationship between neonatal medical risk, sociofamily risk, and family variables with parental competences. A higher medical risk was related to higher scores on maternal sensitivity without this relation being observed for the other dimensions or in fathers.

Previous studies emphasize the need for mothers of preterm infants to be more sensitive, responsive, and facilitative for their infants to reach the same potential as full-term infants (Bilgin & Wolke, 2015). At 2 years of age of these children, more sensitive parenting will favor their brain development, specifically in the subcortical area (Treyvaud et al., 2021), and even at 6–8 years, they will show better academic performance (Jaekel et al., 2015). Interestingly, we found maternal sensitivity to be associated with the medical risk of their children at birth, which has not been previously reported, whereas other parental competence characteristics were not related to the medical risk index, as previously described (McMahon et al., 2019; Rangarajan et al., 2020). One of the strengths of our study is that it is part of a longitudinal study with recruitment at admission in the NICU after birth and the variables were prospectively collected, which supports the consideration of the data as consistent and unbiased.

Sociofamily risk index is related to maternal competences but not to fathers' competences, coinciding with previous studies (Gaunt, 2005; McMahon et al., 2019). There is a positive relation between sociofamily risk and maternal competences in all the subscales. However, our

findings are not as contradictory as they seem at first sight. Previous studies also argue that higher socioeconomic status does not always seem to be an indicator of better competences in mothers (Gaunt, 2005; Martínez González et al., 2021; Polizzi et al., 2021).

Although one would expect social risk to be associated with lower parental competences, these families tend to perceive themselves as more competent concerning efficacy and satisfaction with their parental role (Menéndez et al., 2011; Nunes & Ayala-Nunes, 2017). These mothers might also have an idealized and distorted view of their competences (Rodrigo & Byrne, 2011). According to Nunes & Ayala-Nunes (2017), these families may face daily adversities, such as unemployment and economic pressures, but they manage to educate and raise their children, increasing their perceived efficacy. It is important to consider that these studies were carried out only with families at high social risk, which is not the case in this present study.

In addition, Martínez González et al. (2021) also argued that mothers with higher education may be more critical of themselves and their children, which leads them to question their role as mothers. Finally, it is important to consider other studies that indicate that people with lower levels of education or socioeconomic status have been found to exhibit greater social desirability bias, so their results are presented controlling for mothers' and fathers' educational levels, among other variables (Bornstein et al., 2015).

To better understand these results, it should be noted that in our sample, sociofamily risk index reflects mainly employment status (unemployment) and educational level (lower level). There was a low proportion of other risk indicators (no Spanish spoken [$n = 1$], reconstituted [$n = 13$], or single-parent family [$n = 3$]). In the case of unemployment, as has been indicated, it is mainly female unemployment because the father continues to work. In relation to employed mothers, there is a higher proportion in those with a higher level of education, whereas those with primary studies tend not to be working. The latter might spend more time with their children and have better self-perceived competences, which could also explain part of the results of this study. More hours of work, higher income, and a better education level imply less time dedicated to childcare in the mothers (Gaunt, 2005; Martini et al., 2016), which could lead to a decrease in the quality of care and stimulation provided (Martini et al., 2016). Our work responds to the need expressed in previous studies to examine parental competences in VLBWI in relation to social and family risks factors (Gordo et al., 2018).

Despite the relation between sociofamily risk and maternal competences, this risk was not the one that most influenced the parental competences of these families. According to the literature, family variables such as parental stress, social support, and emotional symptoms are the most important predictors of parental competences and their perception (Perricone et al., 2014; Yang et al., 2020).

It is interesting to highlight the different scores obtained in mothers and fathers. Whereas social support is the variable most associated with fathers' competences, for mothers it is parental stress. Although from birth of the child the fathers become the main support source for the mothers (Landsem et al., 2014), our results suggest the importance of social support for the performance of adequate parenting both in fathers and mothers (Yang et al., 2020). The social-parenting perspective supports the idea that parenting is exercised in coresponsibility with society and requires having social networks (Rodrigo et al., 2010) and, in families of preterm children, having a good network of both formal and informal support acts as a protective factor from the birth of their children (Kim, 2018; Lutz et al., 2012). This is particularly important considering that adequate support reduces stress symptoms in families with preterm infants (Singer et al., 2010). Our results indicate a stronger association between parental stress and maternal competences as well as to their perception, possibly because mothers are more involved in the upbringing of their children, coinciding with the results of Mughal et al. (2017).

Last, the lack of literature on parental competences in families with VLBWI at 18 months hindered the comparison of our results with previous research, and even less so in the Spanish context. Probably, Spanish policies as well as cultural expectations regarding mother and father

roles can be potentially relevant to the development of parental competences in parents of VLBWI infants. For example, maternity and paternity leave in Spain is 16 weeks, although for parents of preterm infants standard leave can be extended for up to 13 weeks, and early intervention is directed at the population of children from 0–6 years of age. These policies may be different in other European or non-European countries.

Although around half of the studies cited in this paper refer to a Spanish sample (e.g., Borràs et al., 2021; Dominguez-Folgueras et al., 2018; García-de-Diego & García-Faroldi, 2022; Rivero et al., 2022) or European sample (e.g., Perricone et al., 2014; Polizzi et al., 2021), other studies cited have been carried out with non-European population. Akkus et al. (2020) emphasized the importance of their study carried out in Turkey, in contrast to studies carried out in Western countries where family-centered care is a standard of care that is rarely implemented in developing countries. Bornstein et al. (2015) highlighted in their analysis of parenting self-reports in nine countries the importance of the cultural psychology and family systems in the results.

Limitations

This study has some limitations that should be considered. The study includes a small sample of mothers and fathers of preterm infants. However, other studies with this population have used similar or even smaller sample sizes (e.g., Pennell et al., 2012). In addition, it was difficult to access this sample due to the conditions extant during the COVID-19 pandemic, which caused some families to refuse to participate. We could not study the sociodemographic characteristics of those not included, so it was not possible to compare them with those families. On the other hand, sociofamily risk index is based on the final counts of the indicators and it does not take into account that the impact of each one of them could be different. In this sense, we consider it interesting to improve this aspect in future research when reaching larger samples. Finally, parental competences and family variables were collected through self-reports, which could mean that these responses could be influenced by social desirability (Bornstein et al., 2015), which could affect the results obtained.

Implications

The results of the present study contribute and support the theoretical foundations proposed in the ecological model of positive parenting (Rodrigo et al., 2010). Taken together, our results suggest the relevance of considering prematurity, sociofamily context, and family variables (such as parental stress, social support, and emotional symptoms) to implement appropriate interventions for supporting parental competence roles after preterm birth over time and promoting child development. This work responds to the proposals expressed by the Council of Europe (2006) and is oriented to enhance the strengths and capabilities of these families to benefit the long-term development of the premature child. This becomes even more important if we consider that children at 18 months of age are in a fundamental phase of their development where the role of the parents will favor the basis for later development.

Up to now in Spain, the promotion of positive parenting in families with preterm infants has only focused on the moment of birth (Estévez et al., 2022). Considering our results, one of the first objectives of the psychosocial intervention will be aimed at improving the self-perception of parental competences in at-risk families. We also recommend that intervention should ensure both fathers' and mothers' involvement by individualizing and adapting the intervention to each family's needs, sociofamily context, and individual variables of each progenitor.

Furthermore, these outcomes will also allow future research on the influence of parental competences in the long-term development of preterm infants.

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How to cite this article: Jiménez-Luque, N., Benavente-Fernández, I., Ruiz-González, E., Lubián-López, S., & Sánchez-Sandoval, Y. (2023). Parental competences in fathers and mothers of very-low-birth-weight preterm infants. *Family Relations*, 1–22. <https://doi.org/10.1111/fare.12907>