



# Quality of Life of Mothers and Fathers 4 to 6 Months After Birth: The Effect of a Very Preterm Delivery

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## Abstract

**Objectives** The sparse literature on the effect of a preterm delivery on parents' quality of life (QoL) yields inconsistent results, restricting their analysis to mothers. The present study aimed to assess the effect of a very preterm delivery on parents' gender-specific perception of QoL, 4 to 6 months after birth.

**Methods** A total of 117 parents of very preterm infants hospitalized at birth in a level III Neonatal Intensive Care Unit, and 214 parents of never hospitalized full-term infants born in a public maternity, both located in the North of Portugal, participated in the study, 4 to 6 months after delivery (November 2013–June 2015). The Portuguese version of the World Health Organization Quality of Life – BREF Inventory was applied and scores were transformed to reflect a 0 to 100 scale.

**Results** The mean [standard deviation (SD)] of overall QoL ranged between 72.1 (13.3) among mothers of full-term infants and 74.6 (12.5) among mothers of very preterm infants. The perception of QoL was not significantly different among parents of very preterm and full-term infants, according to gender. The highest scores were observed in the psychological and physical dimensions, for both mothers and fathers.

**Conclusions for Practice** The lack of differences on the perception of QoL among mothers and fathers of very preterm and full-term infants, highlights the need to deeply understand and explore the influence of accommodation mechanisms, the extended family/community and health policies on parental QoL trajectories.

## Significance

*What is Already Known on this Subject?* The effect of a preterm delivery on parents' QoL yields inconsistent results, mainly due to a considerable heterogeneity regarding the operationalization of QoL, the use of different units of analysis, and different periods of data collection. Also, most studies restrict their analysis to mothers, with few attempts to assess parents' QoL during mother's return-to-work period.

*What this Study adds?* Parents who experience increased family burden and distress after a very preterm delivery do not perceived their QoL 4–6 months after delivery differently than parents of full-term infants.

**Keywords** Infant · Premature · Intensive care units, Neonatal · Parents · Quality of life

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## Introduction

Mothers and fathers of very preterm infants, born before 32 gestational weeks, reveal an increased risk for developing several psychopathological symptoms (Baia, et al., 2016; Lee, et al., 2019; Trumello, et al., 2018), along with poor family functioning (Treyvaud, 2014), than families of full-term born infants. Literature supports that caring for a very preterm infant requires an intense care and vigilance which affect parents' QoL in several ways (Korvenranta, et al., 2010), namely due to concerns about their infant's safety and ongoing development, social isolation, marital distress and financial burden (Hall, et al., 2017; Lakshmanan, et al., 2017). Such context highlights the complexity of this parental experience and stresses the importance of recognizing emotional responses, cognitive appraisals and social and structural factors affecting mothers' and fathers' QoL after a preterm childbirth (Alves, Amorim, Baía, & Silva, 2017). In this context, a better understanding of the influence of a preterm childbirth on parental QoL is essential for designing and implementing family integrated care policies and practices, during and after hospitalisation in a NICU (Bastani, Abadi, & Haghani, 2015; Lakshmanan, et al., 2017). However, the effect of a preterm delivery on parents' quality of life (QoL) yields inconsistent results (Amorim, Silva, Kelly-Irving, & Alves, 2018). While a study described poorer QoL among mothers of preterm infants in comparison with mothers of full-term infants, 1 and 3 weeks post-partum (Hill & Aldag, 2007), others found no differences on QoL between preterm and full-term mothers at 6 months post-partum (Sharma & Sohi, 2007), between very low birth weight and full-term caregivers (97.6% mothers) 12 to 18 months after delivery (Donohue, Maurin, Kimzey, Allen, & Strobino, 2008), or between very preterm and full-term parents (90.6% mothers) 27 years after birth (Wolke, Baumann, Busch, & Bartmann, 2017). In contrast, a study performed 3 months after discharge concluded that parents (88% mothers) of extremely preterm infants experienced better QoL when compared with parents of later gestation infants (McAndrew, et al., 2019). Thus, comparisons across studies are difficult due to a considerable heterogeneity observed regarding the operationalization of QoL, the use of different units of analysis (mothers, parents, families and caregivers), and different periods of data collection.

Most studies on parental QoL restrict their analysis to mothers (Amorim, Silva, et al., 2018). A gender-specific assessment is needed to understand how parenthood is linked to well-being both among men and women (Amorim, Alves, Kelly-Irving, Ribeiro, & Silva, Amorim, et al., 2018a, b). In fact, fatherhood has been associated with greater life satisfaction, happiness, positive affect, and less with depressive symptoms, whereas the findings for motherhood have

demonstrated mixed experiences (Nelson, Kushlev, English, Dunn, & Lyubomirsky, 2013). Additionally, few attempts have been made to assess mothers' and father's QoL during mother's return-to-work period, when major behavioural and psychosocial alterations occur in family life (Lucia-Casademunt, Garcia-Cabrera, Padilla-Angulo, & Cuellar-Molina, 2018).

This study assessed the effect of a very preterm delivery on gender-specific perception of QoL among parents of very preterm and full-term infants, 4 to 6 months after birth.

## Methods

This study is based on two cohorts of mothers and fathers (Alves, Amorim, Fraga, Barros, & Silva, 2014; Alves, et al., 2015), inquired 4 to 6 months after birth, the common return-to-work period in Portugal (Statistics Portugal, 2020). The study was approved by the Ethics Committees of all health settings where participants were recruited and written informed consent was obtained from the participants according to the World Association's Declaration of Helsinki.

All mothers and fathers of very preterm infants (< 32 weeks' gestational age) hospitalized, between July 2013 and June 2014, in the seven level III Neonatal Intensive Care Units (NICU) from Northern Health Region of Portugal, were consecutively and systematically invited to participate (Alves, et al., 2014). Parents were approached 15 to 22 days after birth, during the infants' hospital stay and 96.8% accepted to be part of the study. Between October and December 2014, parents of never hospitalized full-term infants ( $\geq 37$  weeks' gestational age) born at the public maternity centre with the largest number of deliveries from the North of Portugal, were recruited 24 to 72 h after delivery (Alves, et al., 2015). Infants were considered as never hospitalized at baseline if they were not hospitalized in a NICU or a paediatric ward during the usual hospitalization period of the mother after birth (48 to 72 h). Overall, 92.5% of the eligible families accepted to be part of the study.

Four to six months after delivery, all families were contacted by telephone or e-mail to confirm their availability for receiving the questionnaires at home. Self-administered questionnaires to be completed individually were sent by mail to 92 families of very preterm infants and to 268 families of full-term infants, with prepaid return envelopes. Parents who accepted to participate and did not return the questionnaire within approximately 1 month were reminded to do so, by telephone or e-mail, up to three times.

Data on gender, socioeconomic characteristics, number of previous children and infants' health problems (inguinal and umbilical hernias, metabolic disease, ovarian cysts, bronchial dysplasia, autoimmune disease, cardiac disease

or congenital malformation) was collected by self-report, at follow-up. Symptoms of anxiety and depression were assessed through the Portuguese versions of the Beck Anxiety Inventory (BAI) (Quintão, Delgado, & Prieto, 2013) and the Beck Depression Inventory-II (BDI) (Campos & Goncalves, 2011). Parenting stress was assessed through the Parenting Stress Index (PSI) (Abidin, 2012), which provides scores for overall level of parenting stress and for the stressful life events scale. Perceived QoL was measured using the World Health Organization Quality of Life – BREF Inventory (WHOQOL-BREF) (Vaz-Serra, et al., 2006), organized into a facet of *overall QoL* and 4 specific domains: physical (pain and discomfort; energy and fatigue; sleep and rest; dependence on medication; mobility; activities of daily living; working capacity), psychological (positive and negative feelings; self-esteem; thinking, learning, memory and concentration; body image; spirituality, religion and personal beliefs), social relationships (personal relations; sexual activity; social support), and environment (financial resources; information and skills; recreation and leisure activities; home environment; accessibility and quality of health and social care; physical safety and security; physical environment; transport). All domains' scores were transformed to reflect a 0 to 100 scale, where higher values represent better QoL.

Participants who completed the questionnaire more than 6 months after delivery were excluded from the current analysis ( $n=69$ ). Among the remaining, 67 families (67 mothers and 64 fathers) of very preterm infants and 116 families (115 mothers and 104 fathers) of full-term infants completed the questionnaire, between November 2013 and June 2015. After exclusion of the participants with more than 20% of missing values on the WHOQOL-BREF (Vaz-Serra et al., 2006), 61 mothers and 56 fathers of very preterm infants and 112 mothers and 102 fathers of never hospitalized full-term infants were included in the analysis.

Statistical analysis was performed using Stata 15.1 (College Station, TX, 2009). Missing values of the WHOQOL-BREF inventory, BDI, BAI and PSI were treated as recommended for each scale (Abidin, 2012; Campos and Goncalves, 2011; Vaz-Serra, et al., 2006). Analysis was stratified by gender. The chi-square test was used to compare proportions between groups and the t-test or the Mann-Whitney-test was used to compare continuous variables between the two groups, as appropriate.

## Results

There were no significant differences between parents who experienced a very preterm delivery and those who had a full-term delivery regarding sociodemographic and obstetric characteristics (Table 1). Infants' health problems were more

frequently reported by mothers and fathers of very preterm infants ( $p < 0.001$  and  $p = 0.008$ , respectively). Mothers who had a delivery before the 32 weeks of gestation presented higher levels of parenting stress ( $p = 0.035$ ) than mothers who delivered full-term infants, while fathers of very preterm infants revealed higher levels of anxiety ( $p = 0.005$ ) and depression ( $p = 0.044$ ) in comparison with full-term fathers, 4 to 6 months after delivery. There were no multiple pregnancies in the full-term delivery group, while 19.7% of mothers and 19.6% of fathers of very preterm infants had a twin pregnancy.

The mean [standard deviation (SD)] of overall QoL ranged between 72.1 (13.3) among mothers of full-term infants and 74.6 (12.5) among mothers of very preterm infants (Fig. 1). The highest scores were observed in the psychological and physical dimensions, for both preterm and full-term mothers and fathers. The perception of QoL was not significantly different for any of the evaluated domains, among parents of very preterm and full-term infants, according to gender.

## Discussion

Four to six months after birth, the perception of QoL was not significantly different among mothers and fathers of very preterm and full-term infants. Overall, the scores of QoL reported in this study, as well as the order of importance of the respective domains are comparable to the results described for the Portuguese general population (Patrício, Jesus, Cruice, & Hall, 2014).

The findings of the present study reveal that the increased family burden and parental distress after a very preterm delivery (Gerstein, Njoroge, Paul, Smyser, & Rogers, 2019; Treyvaud, 2014) do not translate on a worst parental perception of QoL 4–6 months after delivery, when compared to parents of full-term infants. Such achievement aligns with the results of a previous study conducted in Ludhiana, India, with mothers of preterm and full-term infants in the first 6 months after the delivery (Sharma M & Sohi I, 2007). However, parents' internal standards, expectations, needs and values may be shaped by cultural and health-system based factors and the critical circumstances of the child's hospitalization in NICU, which hampers the generalizability of these findings. In Portugal, the mobilization of accommodation mechanisms contributes to overcome the factors constraining parental QoL, including being optimistic, reordering goals, social comparison and reframing expectations (Amorim, Alves, et al., 2018). Such strategies, along with the embodiment of intensive motherhood (Bell, 2004), i.e. the prioritization of child's health and well-being over parents QoL and the focus on the infant's positive contribution to family life (Lou, Pedersen, & Hedegaard, 2009), may help

**Table 1** Sociodemographic, obstetric and psychosocial characteristics of the participants, according to gestation duration, stratified by gender

	Mothers		<i>p</i>	Fathers		<i>p</i>
	Very preterm delivery n = 61	Full-term delivery n = 112		Very preterm delivery n = 56	Full-term delivery n = 102	
Age (years), n (%)						
< 35	42 (68.9)	81 (72.3)		29 (55.8)	52 (54.2)	
≥ 35	19 (31.1)	31 (27.7)	0.631	23 (44.2)	44 (45.8)	0.852
Marital status, n (%)						
Married/living with a partner	56 (91.8)	97 (87.4)		49 (92.5)	92 (94.9)	
Single/divorced/widow	5 (8.2)	14 (12.6)	0.377	4 (7.5)	5 (5.2)	0.555
Education level (years), n(%)						
≤ 12	34 (55.7)	61 (55.0)		35 (66.0)	60 (61.2)	
> 12	27 (44.3)	50 (45.0)	0.921	18 (34.0)	38 (38.8)	0.559
Monthly household income (€), n (%)						
≤ 1500	36 (59.0)	71 (65.1)		31 (59.6)	61 (65.6)	
> 1500	25 (41.0)	38 (34.9)	0.428	21 (40.4)	32 (34.4)	0.474
Subjective Social Class, n (%)						
Low/Medium-low	43 (71.7)	88 (83.0)		44 (84.6)	80 (87.9)	
Medium-High/High	17 (28.3)	18 (17.0)	0.085	8 (15.4)	11 (12.1)	0.576
Previous children, n (%)	16 (26.2)	31 (27.9)	0.811	13 (26.0)	23 (25.6)	0.954
Multiple pregnancy, n(%)	12 (19.7)	0 (0)	N.A.	11 (19.6)	0 (0)	N.A.
Infants' health problems <sup>a</sup> , n (%)	15 (24.6)	5 (4.5)	<b>&lt; 0.001</b>	10 (17.9)	5 (4.9)	<b>0.008</b>
Anxiety (BAI), Median (P25-P75) <sup>b</sup>	3.0 (1.0-7.7)	4.0 (1.0-7.0)	0.937	2.0 (1.0-5.0)	1.0 (0.0-3.0)	<b>0.005</b>
Depression (BDI), Median (P25-P75) <sup>c</sup>	6.0 (3.0-9.0)	6.0 (4.0-9.0)	0.707	3.5 (1.0-6.0)	2.0 (1.0-5.0)	<b>0.044</b>
Parenting Stress Index (PSI)						
Total stress scale, Median (P25-P75) <sup>d</sup>	220.0 (204.0-245.0)	204.0 (175.0-228.0)	<b>0.035</b>	209.0 (188.0-254.0)	201.0 (173.0-220.0)	0.106
Stressful life events, Median (P25-P75) <sup>e</sup>	11.0 (4.0-19.0)	13.0 (5.0-20)	0.320	10.0 (4.0-15.0)	8.0 (3.0-14.0)	0.517

In each variable, the total may not add 61, 112, 56 or 102 due to missing values; Missing values of the WHOQOL-BREF inventory were replaced by means of the remaining domain items, when ≤ 2 items were missing from the domains physical, psychological and environment and 1 item in the social relationships domain (Vaz-Serra et al, 2006). To compute the BDI and BAI scores, participants with > 2 items missing were discarded from the current analysis and the remaining missing values were replaced by the mean value for each item (Campos & Gonçalves, 2011). Missing values in the PSI were replaced by the subscale items if no more than 5 items from total scale, 3 items from each domain, and 1 item from each subscale, were missing (Abidin, 2012). Bold font indicates statistically significant associations. *NA* Not applicable.

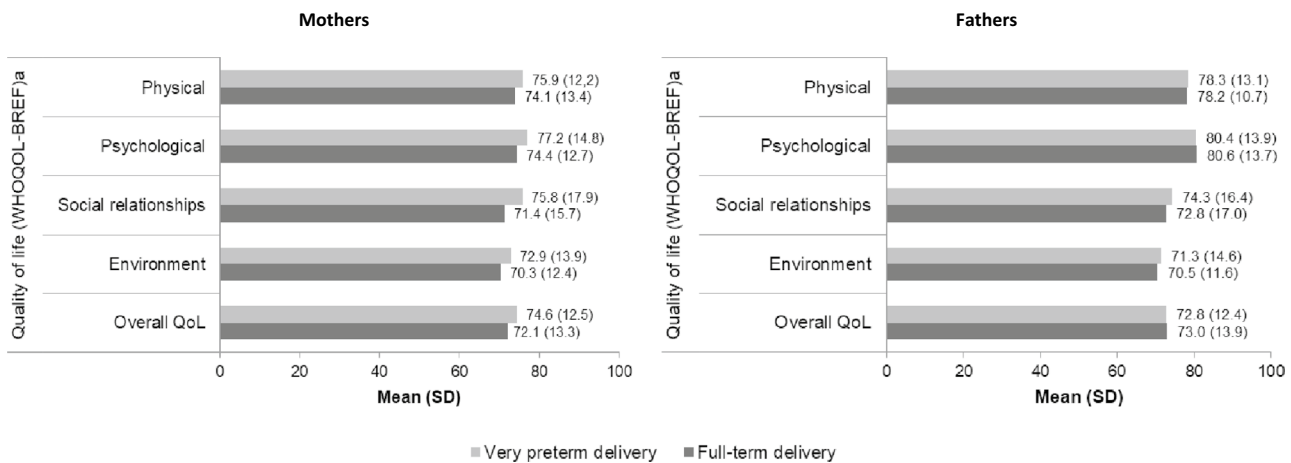
<sup>a</sup>Inguinal and umbilical hernias, metabolic disease, ovarian cysts, bronchial dysplasia, autoimmune disease, cardiac disease, congenital malformation; <sup>b</sup>Higher values indicate higher levels of anxiety (range for total scale: 0 to 63); <sup>c</sup>Higher values indicate higher levels of depression (range for total scale: 0 to 63); <sup>d</sup>Higher values indicate higher levels of parenting stress (range for total scale: 104 to 517); <sup>e</sup>Higher values indicate higher occurrence of stressful life events (range for total scale: 0 to 114)

to normalize disruptive events related with parenthood and to maintain the levels of parental QoL similar to the general Portuguese population (Patrício, et al., 2014).

The few studies focusing on gender and QoL reported a similar perception of QoL between women and men among the general population (Patrício, et al., 2014) and among parents of very preterm (Amorim, Alves, et al., 2018) or very low birth weight infants (Nordheim, Rustoen, Solevag, Smastuen, & Nakstad, 2018). Our results also revealed that the perception of overall QoL was not significantly different by gender, reinforcing the idea that the transition to

parenthood involves major psychosocial adjustments for both women and men.

The findings of the present study contribute to a growing literature addressing the effect of a very preterm delivery on parental perception of QoL, during the return-to-work period. The inclusion of fathers in the research enables the assessment of gender differences in the perception of QoL according to the gestation duration, in a field were studies mostly focused on mothers. However, some limitations should be discussed. Firstly, the nature of sampling and the modest sample size limit the power to detect potentially



SD, standard deviation.

<sup>a</sup>The WHOQOL-BREF Inventory is organized into a facet of overall QoL (general perception of QoL and health) and 4 specific domains: physical (pain and discomfort; energy and fatigue; sleep and rest; dependence on medication; mobility; activities of daily living; and work capacity), psychological (positive and negative feelings; self-esteem; thinking, learning, memory and concentration; body image; and spirituality, religion and personal beliefs), social relationships (personal relations; sexual relations; social support), and environment (financial resources; information and skills; recreation and leisure; home environment; access to health and social care; physical safety and security; physical environment and transport). Higher scores indicate better perception of quality of life. Higher values represent better QoL (range for scale: 0 to 100).

**Fig. 1** Quality of life of mothers and fathers 4–6 months after delivery, according to gestation duration. SD, standard deviation.<sup>a</sup>The WHOQOL-BREF Inventory is organized into a facet of overall QoL (general perception of QoL and health) and 4 specific domains: physical (pain and discomfort; energy and fatigue; sleep and rest; dependence on medication; mobility; activities of daily living; and work capacity), psychological (positive and negative feelings; self-esteem; thinking, learning, memory and concentration; body image; and spirituality, religion and personal beliefs), social relationships (personal relations; sexual relations; social support), and environment (financial resources; information and skills; recreation and leisure; home environment; access to health and social care; physical safety and security; physical environment and transport). Higher scores indicate better perception of quality of life. Higher values represent better QoL (range for scale: 0 to 100).

ity, religion and personal beliefs), social relationships (personal relations; sexual relations; social support), and environment (financial resources; information and skills; recreation and leisure; home environment; access to health and social care; physical safety and security; physical environment and transport). Higher scores indicate better perception of quality of life. Higher values represent better QoL (range for scale: 0 to 100).

important differences between very preterm and full-term mothers and fathers. Also, it is possible that the parents who needed more complex care scenarios chose not to respond to the questionnaire. These limitations preclude an empirical explanation of the differences and non-differences in the analysis. Secondly, the instrument selected for assessing QoL, the WHOQOL-BREF inventory, is not specific for mothers, fathers or the post-partum period, and may have failed to pick up the specificities associated to parenthood (Mogos, August, Salinas-Miranda, Sultan, & Salihu, 2013), influencing the similar results on QoL between mothers and fathers of very preterm and full-term infants. However, this instrument has been widely used and it is validated for the Portuguese population (Vaz-Serra, et al., 2006), and has been previously used to study the QoL on particular populations during the transition to parenthood (Fonseca, Nazare, & Canavarró, 2012) and on mothers of preterm infants (Sharma & Sohi, 2007).

The lack of differences on the perception of QoL among mothers and fathers of very preterm and full-term infants, highlights the need for further investigations to deeply understand the effect of preterm delivery on parents’ QoL and to explore the influence of accommodation mechanisms, the extended family/community and health policies on parental QoL trajectories. Future studies should incorporate qualitative approaches to explore factors influencing

parental QoL during first months of parenthood not covered by quantitative instruments. Such knowledge is crucial for the development of integrated and gender-equality health-care policies and guidelines that promote the long-term QoL of mothers and fathers.

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**Author Contributions** All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by EA, MA, CN and SS. The first draft of the manuscript was written by EA and all authors commented on precious versions of the manuscript. All authors read and approved the final manuscript.

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**Data Availability** Data will be available upon request.

**Code Availability** Not applicable.

## Declarations

**Conflict of interest** The authors have no conflict of interests to declare.

**Ethical Approval** The study was approved by the National Data Protection Commission and the Ethics Committees of all hospitals where the study was performed.

**Consent to Participate** All participants accepted to participate in the study and written informed consent was obtained from all.

**Consent for Publication** Not applicable.

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