

SOCIOECONOMIC FACTORS, HEALTHCARE ACCESSIBILITY, AND DEPRESSION AMONG PARENTS OF VERY LOW BIRTH WEIGHT INFANTS

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ABSTRACT

Background: Parents of very low birth weight (VLBW) infants may experience psychological and socioeconomic challenges related to the care of their infants, including difficulties in accessing healthcare services and meeting unexpected care-related expenses. This study aimed to analyze the association between socioeconomic factors, healthcare accessibility, and depression levels among parents of VLBW infants at RSUD Ciawi, Bogor, Indonesia. **Methods:** A cross-sectional study was conducted among 55 parents of VLBW infants. Data were collected on healthcare accessibility, including travel distance, travel time, and perceived accessibility, as well as socioeconomic characteristics, including parental education, employment status, income, ability to meet unexpected expenses, and household economic stability. Depression levels were assessed and categorized into normal and significant depression levels. The associations between study variables and depression levels were analyzed using the chi-square test. **Results:** Among 55 respondents, 8 (14.5%) had a normal depression level, while 47 (85.5%) had a significant depression level. No statistically significant associations were found between depression levels and travel distance to the hospital ($p=0.50$), travel time ($p=0.96$), perceived healthcare accessibility ($p=0.17$), parental education ($p=0.34$), employment status ($p=0.31$), income ($p=0.15$), or household economic stability ($p=0.63$). However, the ability to meet unexpected expenses, including transportation and special milk costs, was significantly associated with depression levels ($p=0.04$). **Conclusion:** Most parents of VLBW infants in this study experienced significant depression levels. Although most socioeconomic and healthcare accessibility variables were not significantly associated with depression, the ability to meet unexpected expenses was significantly associated with depression levels. Financial and psychosocial support may be important components of care for families of VLBW infants.

Keywords: Depression; Financial burden; Healthcare accessibility; Parents; Very low birth weight

INTRODUCTION

Very low birth weight (VLBW) infants require intensive care and close monitoring because of their vulnerability to health complications and their need for specialized healthcare services. The birth of a VLBW infant can therefore create substantial challenges for parents, not only in providing continuous care but also in managing the financial and practical demands associated with treatment and follow-up care (Caporali *et al.*, 2020). These challenges may affect parents' psychological well-being and increase their vulnerability to depression (Nguyen *et al.*, 2023).

The psychological condition of parents is an important aspect of care for VLBW infants because parental well-being may influence their ability to provide consistent care and respond to the infant's healthcare needs (Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022). The burden experienced by parents can be influenced by socioeconomic circumstances, including educational attainment, employment status, household income, and the ability to meet unexpected expenses. Financial difficulties may become particularly important when families have to cover additional costs such as transportation to healthcare facilities, specialized infant

nutrition, and other unexpected care-related needs (Lakshmanan *et al.*, 2022; Younge *et al.*, 2023).

In addition to socioeconomic circumstances, accessibility to healthcare services may contribute to the psychological burden experienced by parents (Adama, Bayes and Sundin, 2016; Franck, McNulty and Alderdice, 2017; Adama *et al.*, 2022). Geographic distance, travel time, and parents' perceptions of the ease or difficulty of accessing healthcare facilities may affect the effort and resources required to obtain appropriate care for VLBW infants. Families who experience greater barriers to accessing healthcare may face additional stress, particularly when their infants require frequent medical monitoring and specialized services.

Although previous studies have identified socioeconomic difficulties and barriers to healthcare access as important factors in the psychological experiences of parents of preterm and VLBW infants, several gaps remain. First, existing evidence has often examined socioeconomic burden and healthcare-related stress separately, leaving uncertainty about whether socioeconomic circumstances and healthcare accessibility are independently associated with parental depression when considered simultaneously. Second, much of the available evidence has been generated in healthcare settings and populations outside Indonesia, which may limit its applicability to Indonesian families who face different socioeconomic conditions and healthcare-access patterns. Consequently, limited evidence is available on the combined relationship of socioeconomic factors and healthcare accessibility with depression among parents specifically caring for VLBW infants in Indonesian hospital settings. This gap is important because the psychological burden associated with caring for a VLBW infant may be influenced not only by the infant's clinical needs but also by the family's socioeconomic resources and ability to access continuing healthcare. Therefore, this study aimed to examine the association of socioeconomic factors and healthcare accessibility with depression among parents of VLBW infants at RSUD Dr. K.H. Idham Chalid Ciawi, Bogor, Indonesia. By examining these factors simultaneously within the same study population, this study addresses an important evidence gap and provides context-specific evidence on potential socioeconomic and healthcare-access determinants of parental depression, which may help inform the identification of parents who require additional psychosocial support.

METHODS

This study employed a quantitative cross-sectional design, supported by qualitative data obtained through in-depth interviews. The quantitative component was used to examine the association between socioeconomic factors, healthcare accessibility, and depression among parents of very low birth weight (VLBW) infants, while the qualitative component was used to provide contextual insights into parents' experiences and perceptions related to socioeconomic circumstances, healthcare access, and psychological burden. The study was conducted at RSUD Dr. K.H. Idham Chalid Ciawi, Bogor, Indonesia, from May to July 2026.

The study population comprised parents of VLBW infants receiving care or follow-up services at the study setting during the study period. Participants were selected using purposive sampling based on predetermined eligibility criteria. All parents who met the inclusion criteria and were available during the study period were recruited as study participants. The quantitative component included 55 respondents recruited between May and July 2026. In

addition, two participants were purposively selected for in-depth interviews to obtain a more comprehensive understanding of the experiences and challenges faced by parents of VLBW infants..

The dependent variable was parental depressive symptoms, measured using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D-10)(Marvianto, 2023). The CES-D-10 was selected because it is a brief and widely used instrument for assessing depressive symptoms, allowing systematic assessment while minimizing respondent burden. This characteristic was considered appropriate for parents of VLBW infants, who may experience substantial time, caregiving, and emotional demands during their infants' treatment and follow-up care. The depression score was categorized into normal and significant depressive symptom levels according to the predetermined scoring criteria. The independent variables included socioeconomic factors and healthcare accessibility. Socioeconomic variables consisted of parents' educational level, employment status, household income, ability to meet unexpected expenses, including transportation and special milk costs, and the perceived impact of household economic stability. Healthcare accessibility was assessed based on travel distance to the hospital, travel time to the hospital, and perceived accessibility.

Quantitative data were collected through structured questionnaires administered by interviewers. The questionnaire collected information on respondents' socioeconomic characteristics, healthcare accessibility, and depression symptoms. The CES-D-10 was administered through an interview to assess depressive symptoms. The qualitative component involved in-depth interviews with two selected respondents to explore their experiences related to caring for VLBW infants, healthcare access, financial challenges, and psychological experiences.

Quantitative data were analyzed using IBM SPSS Statistics. Descriptive analysis was performed to summarize the distribution of respondents and study variables. Bivariate analysis was conducted using the chi-square test to examine the association between socioeconomic factors, healthcare accessibility, and depression level. Statistical significance was determined at $p < 0.05$. The qualitative interview data were used to provide contextual information regarding the experiences of parents and were interpreted descriptively.

RESULTS

Quantitative Findings

A total of 55 parents of very low birth weight (VLBW) infants were included in the study. Based on the assessment of depression levels, 8 respondents (14.5%) were categorized as having a normal depression level, whereas 47 respondents (85.5%) were categorized as having a significant depression level. These findings indicate that significant depression was considerably more common among parents of VLBW infants in the study population.

Regarding healthcare accessibility, 11.1% of parents living within 13 km of the hospital had a normal depression level and 88.9% had a significant depression level, compared with 17.9% and 82.1%, respectively, among those living more than 13 km from the hospital. No significant association was observed between travel distance and depression level ($p = 0.50$). Similarly, among parents with a travel time of ≤ 30 minutes, 14.7% had a normal depression level and 85.3% had a significant depression level, compared with 14.3% and 85.7%,

respectively, among those requiring more than 30 minutes. Travel time was not significantly associated with depression level ($p=0.96$). Perceived healthcare accessibility also showed no significant association with depression level ($p=0.17$). Among parents who perceived healthcare access as easy, 20.7% had a normal depression level and 79.3% had a significant depression level, whereas among those who perceived access as difficult, the corresponding proportions were 7.7% and 92.3%.

For socioeconomic characteristics, depression levels did not differ significantly according to parental educational level ($p=0.34$), employment status ($p=0.31$), or household income ($p=0.15$). Among parents with low or medium educational levels, 13.5% had a normal depression level and 86.5% had a significant depression level, compared with 33.3% and 66.7%, respectively, among those with higher education. Parents who were not employed had 6.7% normal and 93.3% significant depression levels, while employed parents had 17.5% and 82.5%, respectively. Regarding household income, 10.3% of parents with an income of $\leq$ IDR 4,500,000 had a normal depression level and 89.7% had a significant depression level, compared with 25.0% and 75.0%, respectively, among those with an income $>$ IDR 4,500,000.

The ability to meet unexpected expenses, including transportation and special milk costs, was the only socioeconomic variable significantly associated with depression level ($p=0.04$). Among parents who reported that meeting unexpected expenses was very difficult, 100.0% had a normal depression level and 0.0% had a significant depression level. Among those reporting that it was difficult, 5.3% had a normal depression level and 94.7% had a significant depression level. The corresponding proportions were 14.8% and 85.2% among those reporting sufficient ability and 25.0% and 75.0% among those reporting easy ability.

Finally, household economic stability was not significantly associated with depression level ($p=0.63$). Parents who reported that household economic instability was very disruptive had 0.0% normal and 100.0% significant depression levels. The corresponding proportions were 10.0% and 90.0% among those reporting that it was disruptive, 14.3% and 85.7% among those reporting that it was less disruptive, and 25.0% and 75.0% among those reporting that it was not disruptive. Overall, the findings suggest that the ability to meet unexpected care-related expenses was the only examined factor showing a statistically significant association with parental depression level.

Table 1 Characteristics and Depression Level

Characteristics	Depression Level		p-value
	Normal n=8 (14.5%)	Significant n=47 (85.5%)	
Travel Distance to Hospital			
• Near (≤ 13 km)	3 (11.1)	24 (88.9)	0.50
• Far (> 13 km)	5 (17.9)	23 (82.1)	
Travel Time to Hospital			
• Short (≤ 30 minutes)	5 (14.7)	29 (85.3)	0.96
• Long (> 30 minutes)	3 (14.3)	18 (85.7)	
Perceived Accessibility			
• Easy	6 (20.7)	23 (79.3)	0.17
• Difficult	2 (7.7)	24 (92.3)	

Characteristics	Depression Level		p-value
	Normal n=8 (14.5%)	Significant n=47 (85.5%)	
Parents' Educational Level			
• Low and Medium	7 (13.5)	45 (86.5)	0.34
• High (Diploma, Bachelor's, Master's, Doctoral)	1 (33.3)	2 (66.7)	
Parents' Employment Status			
• Not employed	1 (6.7)	14 (93.3)	0.31
• Employed	7 (17.5)	33 (82.5)	
Parents' Income			
• ≤ IDR 4,500,000	4 (10.3)	35 (89.7)	0.15
• > IDR 4,500,000	4 (25.0)	12 (75.0)	
Ability to Meet Unexpected Expenses (<i>transportation, special milk</i>)			
• Very difficult	1 (100.0)	0 (0.0)	0.04
• Difficult	1 (5.3)	18 (94.7)	
• Sufficient	4 (14.8)	23 (85.2)	
• Easy	2 (25.0)	6 (75.0)	
Impact of Household Economic Stability			
• Very disruptive	0 (0.0)	2 (100.0)	0.63
• Disruptive	2 (10.0)	18 (90.0)	
• Less disruptive	3 (14.3)	18 (85.7)	
• Not disruptive	8 (25.0)	9 (75.0)	

Qualitative Findings

In-depth interviews with two families of infants with very low birth weight (VLBW) receiving care in the NICU of RSUD Ciawi identified four interrelated themes: psychological distress following the birth of a VLBW infant; financial and time-related burdens associated with care; healthcare services as a source of reassurance; and family support and acceptance as coping resources.

Parents described feeling shocked, sad, worried, and afraid after learning that their infants had VLBW. These emotional responses were accompanied by disrupted sleep, eating patterns, and daily activities during NICU hospitalization.

Although medical costs were covered by BPJS, families still experienced indirect financial and time burdens, particularly transportation costs and difficulties balancing work with hospital visits. These challenges were more pronounced for the family living farther from the hospital. Healthcare services were perceived positively. Parents reported that NICU facilities were helpful, communication with healthcare professionals was clear, and BPJS administration was manageable with staff assistance. Family members were the main source of emotional support. Acceptance of the infant's condition, together with continued hope for recovery, also emerged as important coping mechanisms.

DISCUSSION

This study shows that a substantial proportion of parents of VLBW infants experience significant depression levels, with 47 of 55 respondents (85.5%) classified in the significant depression category. This finding indicates that the birth and care of a VLBW infant may

represent a considerable psychological burden for parents. Previous studies have consistently reported elevated psychological distress among parents of preterm and NICU-admitted infants, including depression, anxiety, stress, and trauma-related symptoms (Ahlqvist-Björkroth, 2020; Caporali *et al.*, 2020; Bernardo *et al.*, 2021; Nguyen *et al.*, 2023; Persson *et al.*, 2023). Ahlqvist-Björkroth *et al.* found that 45% of parents reported depressive symptoms at NICU discharge and that depressive symptoms were positively associated with parental stress and negatively associated with social support. Similarly, previous studies have identified substantial parental stress during the NICU period and throughout the transition home following preterm birth (Lau, Turcich and Smith, 2020; Schmöcker *et al.*, 2020; Garfield *et al.*, 2021). More recent evidence also indicates that parental quality of life is particularly impaired during NICU hospitalization, with psychological distress, inadequate social support, and lack of preparedness identified as important modifiable factors (Yip, 2026). The qualitative findings support this interpretation, as parents described feeling shocked, sad, worried, and afraid after learning that their infants had very low birth weight. These emotional responses were accompanied by disruptions in sleep, eating patterns, and daily activities during the infant's hospitalization in the NICU. Together, the quantitative and qualitative findings suggest that parental psychological distress may emerge from the immediate emotional impact of having a VLBW infant as well as the demands of prolonged and intensive caregiving.

Healthcare accessibility variables, including travel distance, travel time, and perceived accessibility, are not significantly associated with parental depression levels. This finding suggests that physical access to healthcare alone may not adequately explain psychological distress among parents of VLBW infants. Previous studies indicate that access-related barriers in neonatal care are multidimensional and may include logistical, time-related, emotional, and perceptual barriers rather than geographical distance alone (Burnham, Feeley and Sherrard, 2013; Abuidhail *et al.*, 2017). Travel distance has also been identified as a potential barrier to neonatal follow-up attendance, suggesting that geographical accessibility can influence engagement with continuing care even when it does not necessarily translate directly into psychological outcomes. The qualitative findings provide an important explanation for the present result. Parents generally perceived the healthcare services at the NICU positively and reported that the facilities were helpful, communication with healthcare professionals was clear, and BPJS administration was manageable with assistance from healthcare staff. These findings are consistent with evidence emphasizing the emotional, informational, and practical support needs of parents during NICU hospitalization (Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022). Family-centred care and supportive relationships with healthcare professionals may also contribute to better parental psychological outcomes (Axelin, 2022). Therefore, although geographical accessibility remains relevant to the practical burden of care, supportive and responsive healthcare services may help reduce some psychological stress associated with caring for a VLBW infant (Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022; Persson *et al.*, 2023).

The qualitative findings also indicate that the burden of healthcare access is not limited to physical distance or travel time. Although medical costs were covered by BPJS, families continued to experience indirect financial and time-related burdens, particularly transportation expenses and difficulties balancing employment with frequent hospital visits. These challenges

were more pronounced for the family living farther from the hospital. This finding helps contextualize the quantitative results, in which travel distance and travel time were not statistically associated with depression. The absence of statistical significance does not necessarily mean that healthcare access creates no burden; rather, the burden may be expressed through indirect costs, time demands, and disruption of family and work routines that are not fully captured by simple measures of distance or travel time. Previous research has shown that families of preterm infants experience substantial financial worry after NICU hospitalization, with out-of-pocket healthcare costs associated with greater financial concern (Lakshmanan *et al.*, 2022). Other studies have also highlighted the practical and psychosocial demands experienced by parents during and after neonatal hospitalization, including challenges related to caregiving, family responsibilities, and adjustment to life after NICU discharge (Adama, Bayes and Sundin, 2016; Franck, McNulty and Alderdice, 2017; Lau, Turcich and Smith, 2020; Adama *et al.*, 2022). These findings suggest that healthcare accessibility should be understood not only as geographical proximity but also in terms of the financial, temporal, and practical resources required to maintain involvement in neonatal care.

Among the socioeconomic variables examined, the ability to meet unexpected expenses, including transportation and special milk costs, is the only factor significantly associated with depression level ($p=0.04$). This finding is particularly important because household income itself is not significantly associated with depression ($p=0.15$). The difference between these two findings suggests that conventional household income may not adequately capture the financial vulnerability experienced by families caring for VLBW infants. Financial vulnerability may instead reflect the capacity of families to absorb unexpected healthcare-related costs while maintaining employment and other household responsibilities. This interpretation is supported by (Lakshmanan *et al.*, 2022), who found that financial worry was common among families of preterm infants and was associated with out-of-pocket costs related to NICU care. Socioeconomic disadvantage has also been linked to parental mood and affective difficulties in families of children born very preterm, suggesting that socioeconomic circumstances may interact with parental psychological well-being in complex ways (Lean *et al.*, 2023). Similarly, sociodemographic characteristics, parental stress, and social support have been examined as interconnected factors influencing parental experiences in the NICU (Younge *et al.*, 2023). The qualitative interviews reinforce this interpretation. Despite medical costs being covered by BPJS, families continued to face transportation costs and the economic consequences of spending substantial time accompanying their infants in the hospital. Therefore, the immediate ability to manage unexpected care-related expenses may represent a more proximal indicator of financial vulnerability than household income alone (Lakshmanan *et al.*, 2022).

Parental educational level and employment status are also not significantly associated with depression levels. This finding may indicate that the psychological challenges associated with caring for a VLBW infant extend across different socioeconomic groups. Although socioeconomic disadvantage has been associated with parental mood and affective problems in families of children born very preterm (Lean *et al.*, 2023) socioeconomic characteristics do not necessarily operate as isolated predictors of parental psychological distress. Parents may experience substantial emotional and practical demands associated with NICU hospitalization

regardless of their educational or employment background (Abuidhail *et al.*, 2017; Caporali *et al.*, 2020; Adama *et al.*, 2022). Similarly, previous research has highlighted the combined roles of sociodemographic characteristics, parental stress, and social support in shaping parental experiences in the NICU (Younge *et al.*, 2023). Thus, the psychological experience of having a VLBW infant may represent a shared stressor that cannot be fully explained by conventional socioeconomic characteristics alone.

Household economic stability is likewise not significantly associated with depression level ($p=0.63$). This finding further supports the distinction between general economic conditions and specific care-related financial pressures. Families may perceive their overall economic situation as relatively stable while still experiencing difficulty meeting unexpected costs associated with neonatal care. Previous research indicates that financial worry among families of preterm infants is associated with specific healthcare-related and out-of-pocket costs rather than socioeconomic characteristics alone (Lakshmanan *et al.*, 2022). Socioeconomic disadvantage may also influence parental mood through broader psychosocial pathways rather than through household income alone (Lean *et al.*, 2023). Consequently, assessment of parental vulnerability may benefit from considering specific out-of-pocket and indirect costs in addition to conventional socioeconomic indicators.

The qualitative findings identify four interrelated themes that further explain the experiences of parents of VLBW infants: psychological distress following the birth of a VLBW infant, financial and time-related burdens associated with care, healthcare services as a source of reassurance, and family support and acceptance as coping resources. (Lambiase *et al.*, 2024; Wilson *et al.*, 2025; Wu *et al.*, 2025) These themes demonstrate that parental psychological well-being is shaped by multiple interacting factors. Previous qualitative research has described emotional upheaval, uncertainty, adjustment, and the importance of social support among parents experiencing NICU hospitalization (Irwin, Artin and Oxman, 1999; Roth and Jornet, 2014; Schmöker *et al.*, 2020; Grunberg, 2022; Ginsberg *et al.*, 2023). Similarly, parents in neonatal intensive care have been reported to have substantial emotional, informational, and practical support needs (Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022). Positive relationships with healthcare professionals and family-centred care may provide additional support during this stressful period (Axelin, 2022). The present findings are also consistent with evidence that family togetherness and parent–infant closeness may contribute to resilience following psychologically traumatic birth experiences (Persson *et al.*, 2023). Family members were described as the main source of emotional support, while acceptance of the infant's condition and continued hope for recovery emerged as important coping mechanisms. These findings are particularly relevant because recent evidence indicates that parental quality of life is lowest during NICU hospitalization and is influenced by psychological distress, preparedness, and social support (Irwin, Artin and Oxman, 1999; Ginsberg *et al.*, 2023; Yip, 2026)

The combination of quantitative and qualitative findings therefore suggests that parental depression among families of VLBW infants should be understood within a broader psychosocial context. The quantitative findings identify the ability to meet unexpected expenses as an important factor associated with depression, while the qualitative findings demonstrate how financial, time-related, emotional, and caregiving pressures are experienced

in everyday life. This multidimensional perspective is consistent with previous evidence showing that parental mental health in the context of preterm and NICU care is influenced by psychological, social, financial, and caregiving factors (Caporali *et al.*, 2020; Nguyen *et al.*, 2023; Younge *et al.*, 2023). At the same time, supportive healthcare services, clear communication with healthcare professionals, family support, acceptance, and hope may function as resources that help parents cope with the challenges of VLBW care (Roth and Jornet, 2014; Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022; Persson *et al.*, 2023)

These findings have practical implications for VLBW and NICU services. Psychological assessment of parents should be considered alongside the clinical management of the infant, particularly because parental depression and stress are common during the NICU period (Adama, Bayes and Sundin, 2016; Adama *et al.*, 2022; Grunberg, 2022). In addition to screening for depressive symptoms, healthcare providers may need to identify families experiencing difficulties with transportation, unexpected care-related expenses, and competing work or family responsibilities. Evidence from psychosocial intervention studies suggests that targeted interventions can reduce parental stress, anxiety, and depressive symptoms and improve parents' readiness to care for preterm infants (Ginsberg *et al.*, 2023). Clear communication, family-centred care, and strengthening family involvement may further support parental well-being (Axelin, 2022; Yip, 2026). Therefore, financial and psychosocial vulnerability should be considered alongside clinical indicators when planning comprehensive NICU support (van Wyk *et al.*, 2024; Mause *et al.*, 2025; Osborne *et al.*, 2025; Taşgıt and Toptaş Kılıç, 2025).

This study has several limitations. Its cross-sectional design does not allow temporal or causal relationships between socioeconomic factors, healthcare accessibility, and depression to be established. The study is also conducted at a single hospital with a relatively small sample, which may limit the generalizability of the findings. Furthermore, the qualitative component involves only two families and therefore is intended to provide contextual understanding rather than represent the experiences of all parents of VLBW infants. Nevertheless, integrating quantitative findings with parents' lived experiences provides a more comprehensive understanding of the factors associated with parental depression in the context of VLBW care.

CONCLUSIONS

This study found that depression was a substantial psychological concern among parents of VLBW infants at RSUD Dr. K.H. Idham Chalid Ciawi, with 85.5% of respondents classified as having significant depressive symptoms. Among the socioeconomic and healthcare accessibility factors examined, only the ability to meet unexpected care-related expenses, including transportation and special milk costs, was significantly associated with parental depression. Qualitative findings further indicated that indirect financial and time-related burdens persisted despite medical costs being covered by BPJS, while family support, supportive healthcare services, clear communication, acceptance, and hope were important coping resources. These findings highlight the importance of integrating parental psychological screening with attention to indirect care-related financial burdens and psychosocial support as part of comprehensive care for families of VLBW infants.

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