

Quality of life among mothers of preterm newborns in a Malaysian neonatal intensive care unit

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Abstract

Background: As Quality of Life (QoL) becomes progressively vital in health care services, its importance in mother and child health is of no exception too. Quality of life among mothers with a premature newborn is an issue that has led to growing concerns in the health care system. Yet, despite the knowledge about mother's QoL being essential to family-centered planning on prematurity integrated healthcare, current evidence has been scant.

Objective: To examine factors related to the QoL of mothers having preterm newborns hospitalized in the neonatal critical unit.

Methods: A non-probability convenience survey was used in a public hospital in Malaysia, covering 180 mothers whose preterm newborns were hospitalized into level III Neonatal Intensive Care Unit (NICU) through the completion of a 26-questions survey of the World Health Organization Quality of Life (WHOQOL-BREF) and the 26-questions of Parental Stress Scale: Neonatal Intensive Care Unit (PSS: NICU). The data were analyzed using descriptive statistics, bivariate analysis, and Pearson correlation coefficients.

Result: The mean scores for mothers' quality of life were ($M = 3.67$, $SD = 0.73$) and maternal stress ($M = 3.03$, $SD = 0.90$) out of 5. A mother's occupation was found to be the only factor associated with the quality of life among mothers who have preterm newborns admitted to the NICU. Furthermore, maternal role change was found to have a moderate negative relationship with the quality of life ($r = 0.310$, $p = 0.05$).

Conclusion: The findings of this study revealed that the main factors contributing to the mother's QoL during their preterm newborns' NICU admission were role change-related stress. Thus, to maintain a better QoL among this group of mothers during this traumatic period, a special nursing intervention program must be implemented immediately, right after the preterm newborns' admission, to relieve the mothers' stress which has been proven to have a direct effect on the mothers' QoL. The study results will alert healthcare providers, particularly neonatal nurses, on the need to support mothers psychologically in terms of role change. This is to ensure a better quality of life among mothers whose newborns were admitted to the NICU.

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Article info:

Received: 22 September 2021

Revised: 25 October 2021

Accepted: 8 January 2022

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E-ISSN: 2477-4073 | P-ISSN: 2528-181X

Keywords

quality of life; mother of preterm newborn; maternal stress; neonatal intensive care unit; nursing; Malaysia

Background

Pregnancy and giving birth are usual among women of the reproductive age and are frequently reported to be a joyful moment for nearly all women (Lau, 2013). However, going through the process of pregnancy was always hard. It has been proven that maternal health-associated quality of life for

this period is poorer than for non-pregnant women (Lau, 2013). Some studies also reported that mothers with preterm newborns admitted to the Neonatal Intensive Care Unit (NICU) had lower quality of life compared to mothers of full-term newborns (Eiser et al., 2005; Witt et al., 2012). Hence, it is important for healthcare providers, especially neonate nurses, to study mothers' QoL to plan for a better family-centered, integrative nursing on premature care.

Preterm delivery and the admission of preterm newborns to NICU are considered frightening and stressful life experiences, impacting parental QoL in multiple ways. Adding to the postpartum condition, where the mother is in the process of recovery following labor, this will further worsen the mothers' quality of life (Amorim et al., 2018). The postpartum is known to be a critical point where mothers have to adjust to their body changes, family relationship changes, new responsibilities, the demand for social support, and a financial burden (Huang et al., 2012). Few studies consistently show that the QoL among mothers during postpartum would be compromised by sleep disruptions, exhaustion, anxiety, and mental distraction (Amorim et al., 2018; Huang et al., 2012). However, as of now, there is indeed a limited amount of evidence on these issues associated with QoL among mothers with preterm newborn hospitalization. Are they having the same level of QoL, better QoL, or vice-versa with any other group of mothers? Therefore, there is indeed an urgent need to investigate the wellbeing of mothers within this group. The outcomes will be needed to develop more specified nursing interventions to ensure childcare continuity after the newborn is discharged home.

Ninety-four percent of women had experienced several health problems, i.e., tiredness, backache, and sexual dysfunction in the first six postnatal months (Webb et al., 2008). These health problems have been claimed to negatively affect the postnatal mothers' QoL (Mortazavi et al., 2014). In fact, the mothers' QoL, stress level, and child wellbeing were proven to be strongly interrelated during this period (Eiser et al., 2005; Lee & Kimble, 2009). The negative effects following the process of caring the preterm newborns during this period could significantly affect a women's entire life (Mortazavi et al., 2014). In addition, unexpected preterm delivery and the newborn admission to this critical unit might cause an emotional catastrophe to the mothers throughout the post-delivery period; for example, the stress level is higher than the mothers of full-term newborns (Howe et al., 2014; Kaaresen et al., 2008). The mother's perception of their wellbeing throughout post-delivery influences their quality of life. This experience will potentially persist in affecting the parent nurturing behaviors and produce permanent and continual emotional problems and health modification on their kids (Huang et al., 2012; Williams et al., 2007).

Nevertheless, there is a piece of limited information available regarding mothers' QoL following their preterm newborn hospitalization, especially in NICU, despite QoL having been reported as a vital indicator to determine the results of both treatment and services assessment (Bahrami et al., 2013). Thus, this research seeks to investigate more in detail the level of QoL as perceived by mothers whose preterm newborns have been admitted to the NICU. It also aims to identify the mother QoL and its association with NICU-related maternal stress as well as the maternal and infant characteristics.

Methods

Study Design

A cross-sectional study design was employed in this study.

Participants

Using a non-probability convenience sampling, 180 eligible mothers were included in this study. All the mothers who fulfilled the given criteria were enrolled into the study: i) older than 18-year-olds, willing to give their consent and understand either English or Malay, ii) with preterm newborns between 27-34 weeks' gestation, have an Apgar score of greater than 5, and without other major health problems. Their newborns may be on ventilator care or other medical support (CPAP, intravenous infusion), are clinically stable at the moment of enrolment and are admitted to NICU for the last two weeks. Mothers who have (i) quadruplets or more, (ii) illness or mental problems (psychiatric, drug addiction), (iii) a newborn (any surgical problems and critically ill newborns were not included in this survey.

Instruments

Three instruments were used in this study:

Maternal and newborn characteristics. A demographic data sheet on mothers (age, education, occupation, and total family income) and infants (gender, gestational age, birth weight, and the number of the child) was created to gather data on maternal and newborn characteristics.

Maternal quality of life. The World Health Organization QoL (WHOQOL-BREF) was initiated by the World Health Organization quality of life team (The WHOQOL Group, 1998). It comprises 26 questions and a Malay version set; therefore, no translation was needed. The first question is generally regarding the level of quality of life, and the second question evaluates the overall satisfaction in the individual's health. The other 24 questions consist of four components. Namely, (i) physical (PhyC) (seven questions), (ii) psychological (PsyC) (six questions), (iii) social relationship (SRC) (three questions), and (iv) environment (EC) (eight questions). Component scores are ascending scales (higher scores = higher quality of life). The mean score of questions within each component is used to calculate the component score. A pilot study was performed on 40 mothers to check the reliability of WHOQOL-BREF and its components; Cronbach's alpha values were ranged between 0.73-0.89.

Maternal stress. The PSS: NICU revised version by Miles et al. (1993) was used to evaluate maternal experiences on the stressors faced in NICU. It consists of 26 questions self-report scale to determine mother's stress associated with three NICU conditions: NICU's Sight & Sound (PSS: SS) (five questions); ii) Newborn Behavior and Look (PSS: NBL) (fourteen questions); and iii) Maternal Role Change (PSS: MRA) (seven questions). A 5-point Likert scale which ranged from (1= not at all stressful) to (5= extremely stressful) and 0 (no experience or not applicable), was used to rate each question. Mothers who claimed to be stressed out were graded (1-5) appropriately, and those who claimed to be no stress were rated as 0 or not applicable (NA). Scoring was shown in a mean score to allow the comparison between studies. In this study, PSS: NICU scores were based on Ong et al. (2018), which rated the level of stress as high-level stress (4-5), moderate level (3-3.99), and low stress (1-2.99).

The Malay version of the PSS-NICU was lately used by the local study in which the construct validity of PSS: NICU had shown that all items were at satisfactory loading factors, which were more than 0.5. The results indicated that the

measurement model fitted the model with $c2(284) = 579.713$, $p = 0.00$, $c2/DF = 2.041$, $GFI = 0.806$; $CFI = 0.916$; $IFI = 0.917$, $RMSEA = 0.076$ and both convergent and discriminant were met, and results revealed that the Cronbach's Alpha for all subscales and overall was more than 0.90 for PSS-NICU Malay version (Ong et al., 2018).

Data Collection

This study was carried out from December 2015 to June 2016 at one of the main public hospitals covering the rural state on the East Coast of Peninsular Malaysia. The hospital provides tertiary care with a 1200-bedded and a level-III NICU with a total of 48 ventilator outlets. In this study, all 180 eligible mothers on their first visit were approached within 48 hours of their infants' admission, informed about the study, and a two-week appointment date was given for mothers' QoL data collection. Then, a Parental Stress Scale: Neonatal Intensive Care (PSS: NICU) was used to determine the mothers' stress levels. Again, after two weeks of newborns' hospitalization (appointment date), the mothers were given a set of WHOQOL-BREF questionnaires to measure the mothers' quality of life. The QoL data were collected two weeks later to prevent the possibility of mothers' present or earlier reports on the quality of life. This is because, at the first few days of admission, the mothers are still in the adapting stage and have not been affected by the actual situation (stress following the newborns' hospitalization).

Data Analysis

The Statistical Package for Social Sciences (SPSS) version 23 was used to analyze the data. The demographic data and questionnaire items were analyzed using descriptive statistics such as frequency, mean, and standard deviation. The relationships between demographic factors and QoL

components as well as total QoL were assessed using bivariate analysis (independent t-test) and one-way analysis of variance (ANOVA). The association between maternal quality of life and maternal stress and its sub-scales was evaluated using Pearson correlation coefficients. P -value 0.05 was used as the significant threshold.

Ethical Considerations

Our study protocol for the research project has been approved by the Research Ethics Committee, Ministry of Health, Malaysia (Research ID NMRR-14-179-20048) and conforms to the provisions of the Declaration of Helsinki in 1995. Written informed consent was obtained from the participants when all the explanations were given clearly. Email approvals for the use of the WHOQOL-BREF Malay version and PSS: NICU scales were obtained from the originators. The University Malaya library was also noted on the similarity index.

Results

Maternal and Newborn Characteristics

Newborn gender was relatively evenly distributed according to the frequency and distribution of socio-demographic characteristics. High school education was the most common ($n = 110$, or 61.1%) among mothers. Most of the mothers ($n = 96$, 53.3%) were housewives with a monthly family income of less than RM 5000 ($n = 154$, 85.6%). Nearly half ($n = 80$, 44.4%) were first-time mothers. With a mean age of 29.36 ($SD = 5.99$), more than half of the mothers were between the ages of 21 and 30 ($n = 88$, 48.9%). The birth weight of more than half of the neonates ($n = 106$; 58.9) was less than 1500g (Table 1).

Table 1 Maternal and newborn socio-demographic profile, differences in quality of life

| | N (%) / Mean±SD | Physical | Psychological | Social Relation | Environment | QoL |
|--------------------------|--------------------|------------|---------------|-----------------|-------------|-------------|
| | | Component | Component | Component | Component | |
| | | Mean±SD | | | | |
| Age | | | | | | |
| ≤20 | 18 (10) | 3.71±0.602 | 3.57±0.790 | 3.63±0.907 | 3.60±0.753 | 3.92±0.733 |
| 21-30 | 88 (48.9) | 3.46±0.566 | 3.63±0.569 | 3.95±0.653 | 3.69±0.533 | 3.67±0.624 |
| >30 | 74 (41.1) | 3.43±0.610 | 3.56±0.632 | 3.77±0.717 | 3.65±0.645 | 3.71±0.682 |
| Mother Education | | | | | | |
| Primary | 5 (2.8) | 3.31±0.383 | 3.00±0.425 | 3.27±1.038 | 3.13±0.573 | 3.40±0.548 |
| High School | 110 (61.1) | 3.45±0.594 | 3.61±0.639 | 3.79±0.728 | 3.61±0.602 | 3.68±0.719 |
| University Graduate | 65 (36.1) | 3.54±0.597 | 3.63±0.574 | 3.97±0.634 | 3.80±0.574* | 3.78±0.551 |
| Mother Occupation | | | | | | |
| Government | 44 (24.4) | 3.55±0.548 | 3.82±0.564* | 3.95±0.559 | 3.84±0.498 | 3.95±0.589* |
| Private | 40 (22.2) | 3.41±0.646 | 3.65±0.648 | 3.92±0.835 | 3.67±0.628 | 3.66±0.803 |
| Housewife | 96 (53.3) | 3.47±0.588 | 3.48±0.603 | 3.76±0.715 | 3.58±0.623 | 3.54±0.722 |
| Monthly Income | | | | | | |
| <1200 | 31 (17.2) | 3.39±0.463 | 3.45±0.615 | 3.75±0.699 | 3.46±0.578 | 3.55±0.583 |
| 1201-3000 | 77 (42.8) | 3.46±0.601 | 3.62±0.618 | 3.82±0.727 | 3.63±0.646 | 3.64±0.686 |
| 3001-5000 | 46 (25.6) | 3.54±0.581 | 3.67±0.601 | 3.98±0.648 | 3.80±0.526 | 3.89±0.674 |
| <5000 | 26 (15.6) | 3.51±0.717 | 3.57±0.650 | 3.77±0.793 | 3.76±0.570 | 3.80±0.584 |
| Birth Order | | | | | | |
| First Child | 80 (44.4) | 3.48±0.585 | 3.63±0.584 | 3.91±0.705 | 3.70±0.582 | 3.66±0.614 |
| Second Child and Above | 100 (55.6) | 3.48±0.604 | 3.57±0.647 | 3.79±0.719 | 3.63±0.618 | 3.69±0.809 |
| Gender | | | | | | |
| Boy | 99 (55) | 3.49±0.614 | 3.62±0.642 | 3.82±0.744 | 3.68±0.605 | 3.76±0.606 |
| Girl | 81 (45) | 3.46±0.563 | 3.57±0.589 | 3.87±0.674 | 3.65±0.602 | 3.65±0.718 |

Significant level at $p < 0.05$; SD Standard Deviation

Maternal Stress

The mean score for each of the PSS: NICU subscales is provided in [Table 2](#); the highest mean score was reported for

PSS: MRA ($M = 3.34$, $SD = 1.07$), while the lowest mean score was recorded for PSS: SS ($M = 2.72$, $SD = 1.00$). The entire PSS: NICU mean score was $M = 3.03$ ($SD 0.90$) out of 5.

Table 2 Frequency analysis for maternal stress

| | Level | n(%) | Mean±SD |
|-------------------------|-------|-----------|-----------|
| Maternal Role Change | High | 120(66.7) | 3.34±1.07 |
| | Low | 60(33.3) | |
| Newborn Behavior & Look | High | 95(52.8) | 3.02±1.04 |
| | Low | 85(47.2) | |
| Sights and Sounds | High | 90(50.0) | 2.72±1.00 |
| | Low | 90(50.0) | |
| Total PSS: NICU | | | 3.03±0.90 |

QoL Components and Mothers' Background Variables

The WHOQoL-BREF questionnaire gives a report with scores for the four components and two singles components for overall QoL and health perception. Social relationship component (SRC) ($M = 3.84$, $SD = 0.91$) had the highest mean score of the maternal QoL categories, followed by EC ($M = 3.66$, $SD = 0.85$), PsyC ($M = 3.61$, $SD = 0.89$), and PhyC ($M = 3.48$, $SD = 0.88$). This revealed that all the components had a value more than the scale's median (3), indicating that the various components of QoL were moderate.

[Table 3](#) shows the descriptive statistics on the corresponding questions to these four components. According to these results, the highest mean score among questions related to PhyC was on "The mother's ability to get around" (M

$= 3.60$, $SD = 0.94$); and the lowest mean was on "The extent of the physical pain prevents the mother's from doing things" ($M = 3.34$, $SD = 0.95$). The highest mean score for PsyC's on "Mother's level of meaningful in life" ($M = 3.93$, $SD = 0.87$) while the lowest mean score was detected on "Frequency of the mothers felt for negative feelings" ($M = 3.01$, $SD = 0.98$) In SRC, the highest mean score was on "Mother's satisfaction towards support from friends" ($M = 3.86$, $SD = 0.81$) and the lowest mean score was on "Mother's sex life satisfactory" ($M = 3.83$, $SD = 0.84$) In the last component which measured the EC, the highest mean score belonged to "Mother's satisfaction towards her mode of transportation" ($M = 4.04$, $SD = 0.68$), and the lowest mean score was detected on "Mother's physical environment health" ($M = 3.47$, $SD = 0.76$).

Table 3 Descriptive statistics for question-related to maternal quality of life ($n = 180$)

| Component | No | Question | Mean | SD |
|---------------------|-------|---|------|------|
| Overall | 1 | Mother's QoL rating. | 3.69 | 0.80 |
| | 2 | Mother's satisfaction towards her own health. | 3.66 | 0.81 |
| | | Total | 3.67 | 0.73 |
| Physical | 3 | The extent of the physical pain prevents the mothers from doing things. | 3.34 | 0.95 |
| | 4 | Amount of medical treatment needed to function normally in daily life. | 3.35 | 1.01 |
| | 10 | The mother's daily energy level. | 3.58 | 0.84 |
| | 15 | The mother is moving around capability. | 3.60 | 0.94 |
| | 16 | The mother's sleep is satisfactory. | 3.41 | 0.84 |
| | 17 | The mother's level of satisfaction on her ability to perform her daily living activities. | 3.44 | 0.82 |
| | 18 | The mother's level of satisfaction with her work capacity. | 3.51 | 0.78 |
| | | Total | 3.48 | 0.88 |
| Psychology | 5 | Level of enjoyment in mother's daily life. | 3.56 | 0.91 |
| | 6 | Mother's level of meaningful in life. | 3.93 | 0.87 |
| | 7 | The mother's ability to concentrate. | 3.60 | 0.80 |
| | 11 | The mother's satisfaction towards her own bodily appearance. | 3.83 | 0.94 |
| | 19 | The mother's satisfaction with herself. | 3.72 | 0.83 |
| | 26 | Frequency of mother felt for negative emotions. | 3.01 | 0.98 |
| | Total | 3.61 | 0.89 | |
| Social Relationship | 20 | Mother's satisfaction towards personal relationship. | 3.84 | 0.79 |
| | 21 | Mother's sex life satisfactory. | 3.83 | 0.84 |
| | 22 | Mother's satisfaction towards support from friends. | 3.86 | 0.81 |
| | Total | 3.84 | 0.81 | |
| Environment | 8 | Mother's satisfaction towards feeling safe. | 3.61 | 0.76 |
| | 9 | Mother's physical environment health. | 3.47 | 0.78 |
| | 12 | Mother's financial stability. | 3.52 | 1.08 |
| | 13 | Mother's knowledge on their need in day-to-day life. | 3.63 | 0.89 |
| | 14 | Frequency of mother's engagement in leisure activities. | 3.22 | 1.04 |
| | 23 | Mother's satisfaction towards her own living condition. | 3.91 | 0.77 |
| | 24 | Mother's satisfaction towards health services accessibility. | 3.91 | 0.79 |
| | 25 | Mother's satisfaction towards her mode of transportation. | 4.04 | 0.68 |
| | | Total | 3.66 | 0.85 |

[Table 1](#) shows the demographic differences in the four subscales of QoL. Mothers who had completed high school or

college had substantially higher EC scores ($M = 3.80$, $SD = 0.57$) than mothers who had only completed elementary and

secondary school ($p = 0.05$). When compared to those in the private sector and housewives, mothers who work in the government sector had substantially higher PsyC scores ($M = 3.82$, $SD = 0.56$)

Mothers' Total Quality of Life

The total mean score of maternal quality of life ($M = 3.67$, $SD = 0.73$) suggested that the overall level of maternal quality of life was moderate ($M = 3.95$, $SD = 0.59$) when compared to mothers working in the private sector and housewives ($p = 0.05$). **Table 1** shows the highest QoL ratings among mothers working in the government sector.

Association between Maternal Stress and Quality of Life

Table 4 shows the correlations between the three maternal stress subscales and QoL. There were significant ($p = 0.001$) negative weak relationships between QoL and PSS: SS ($r = -0.252$), PSS: NBL ($r = -0.276$), and QoL and PSS: MRA ($r = -0.310$).

Table 4 Pearson correlation coefficient (r) between maternal stress and quality of life

| Maternal Stress | Quality of Life |
|------------------------------|-----------------|
| Sights and Sounds | -0.252* |
| Infant Behavior & Appearance | -0.276* |
| Maternal Role Change | -0.310* |
| PSS: NICU | -0.223** |

*Correlation is significant at the $p 0.05$ level (2-tailed)

Discussion

The result indicates that overall mothers' QoL and its component were reported at a moderate level, though this cohort of mothers may encounter problems following their preterm newborns' hospitalization and the post-delivery phase. The moderate score of this project result could be related to most of the participants being first-time mothers and were younger (<35 years old). Younger mothers might have a good level of marital life quality as well as a good level of psychological wellbeing (Ismail et al., 2015), which they may perhaps get more attention from the spouses, family, and health professionals. Furthermore, when one individual was absorbed into one of the families from the Malay society, automatically, the individual would participate in every event held by the family, the individual is rarely left alone to deal with any difficulties, including childbearing (Yaacob, 2005). Various studies also have stated similar results (Bahrami et al., 2013; Mortazavi et al., 2014; Rezaei et al., 2016; Zubaran et al., 2009). This similarity could be caused by the mothers' joyful feeling and satisfaction of getting a newborn, which might impinge favorably on the overall idea of QoL and contentment (Wada et al., 2020; Zubaran & Foresti, 2011) or the mother's QoL level had increased even though the premature birth newborns have been considered as a misfortune to the family (Mortazavi et al., 2014).

Furthermore, the social relationship component scored the highest among the four elements in maternal QoL. The finding revealed the actual culture of rural Malays on this issue, which has yet to be studied. Nevertheless, through personal

experiences, the author (A Non-Malay, who was in the Malay community for over 50 years) deeply believes that the highest score documented on SRC may probably cause by Malay's rural culture influences, which demonstrates a solid and powerful social interaction between members in the family, members of extended family, and friends. No matter what, the Malay society is strong and ties up in supporting each other, i.e., sharing confinement information and experiences. This reasoning can relate with the present finding, which showed the mothers' perception on the three questions from SRC, i.e., on what level of satisfaction from the friends' support that the mother scored a moderately high level. The positive social system is thought to bring about a strong influence on the outcomes of each perinatal stage, particularly on the mother's wellbeing (Noy et al., 2015), and women with minimal social assistance are likely to have a lesser level of quality of life and are more prone to fall into depression following the delivery, as compared with those good-supported mothers (Webster et al., 2011).

In the present finding, the PhyC score was the lowest of all the quality of life components, but it was yet at a moderate level. With only a few published research articles on mothers' quality of life, most of the reports claimed that the mothers perceived a lower result on the physical health of quality of life (Lee & Kimble, 2009; Wang et al., 2013). This is probably a consequence of preterm newborn hospitalization; the postnatal mother's physical health was said to be overlooked, either by mothers or the health providers. Mothers said to be disregarded themselves because almost all mothers' time was inhabited with their newborns' admission. Postnatal mothers with premature newborns were significantly less likely to receive direct care from midwives at home and use the provided postnatal facilities (Henderson et al., 2016).

The current finding reported that the mothers' sleeping disturbances and body ache were marked at the lower level of the two questions from the PsyC on the mother's sleep satisfactory and the limitation of mother's daily physical activities due to physical pain as compared to other questions. The contributing factors to the lower level of mother physical QoL were reported due to the physical and hormonal changes following the delivery and mothers' sleep disturbances during the newborn admission to the critical unit (Lee & Kimble, 2009; Webster et al., 2011).

Psychology and maternal environmental quality of life are two other components that scored a moderate level. The scores of mothers' quality of life during postnatal was reported at the moderate level in all the components; however, the PsyC was lower in preterm mothers than normal mothers (Rezaei et al., 2016). This fact is agreed by Hill and Aldag, which stated that the lower score of PsyC was associated with a preterm newborn's unstable condition following the admission (Hill & Aldag, 2007). Studies on the psychology and environment components were scantied. Thus, the conversation was depicted on notable questions in each component.

In the PsyC component of six (6) questions, the lowest score question was on the frequency of having negative feelings. It is a self-explanatory statement, as in the actual situation, the admission of the newborn to the critical care unit made the mother in a stage of stress (Howe et al., 2014; Trombini et al., 2008; Woodward et al., 2014), anxiety (Ali et

al., 2009; Fabiyi et al., 2012), and depression (Gulamani et al., 2013; Sockol & Battle, 2015). In terms of environmental component, the two questions which scored the second-highest were 'mother's satisfaction towards her own living condition' and 'satisfaction towards health services accessibility'. None of the studies revealed specifically on the environmental issue. Nevertheless, these three components are worth to be highlighted because the perception of the mothers from this cohort could reflect the local community situation. For example, the question regarding the 'mother's satisfaction towards her mode of transportation', perhaps linked with the present state scheme on vehicle mortgage, which permits every family to own a car or a motorbike or borrow the vehicles from relatives or friends. Therefore, transportation was not a problem for this cohort of mothers.

Mothers were reported to be very satisfied with questions that are related to the health facilities provided. Satisfaction perceived on the health facilities would probably be due to the mother's current prioritization on the health of the newborns who were in critical condition. They subconsciously disregarded their wellbeing and put their trust, confidence, and positivity on the nurses and team in NICU. This trust and confidence, which had developed right after the newborn admission, added with the conveniences offered by the nurses, particularly on a flexible visiting time, would probably cause the mothers' decision on this perception, which is also supported by a previous study (Mortazavi et al., 2014). Additionally, the mothers working with the government sectors tend to have a better quality of life; this could likely be due to the employment (a longer paid maternal leave), and the majority of Malaysian public employees reported to have a moderate economic status (Mokhtar et al., 2015). Research indicated that financial stability is related to overall health (Franz, 2016).

Correlation between Maternal Quality of Life and Stress

As far as we know, the correlation between QoL and mothers' stress with preterm newborns in such a critical setting has not been overly studied earlier. Hence, this project aims to determine if the stress is associated with quality of life on a certain quantified amount or whether the NICU-related maternal stress can justify QoL changes between the postnatal mothers and the existence of stressful events (admission of the newborns to the critical unit). The finding indicated that the NICU-related maternal stress was negatively associated with overall maternal QoL. This finding indicates that the mother's overall quality of life is negatively related to NICU-related stress faced by mothers.

The result was parallel with the previous study by Lee and Kimble (2009). This weak and negative relationship could be due to the interaction differences between expectations and experiences among individuals. There are differences between and within individuals according to some universal aspects of life which are relevant to QoL and asserted that the determinants and evaluations of QoL are extremely specific to an individual (Carr & Higginson, 2001). Another possible explanation could be related to the timing of when the data was collected: QoL (at two weeks post-admission) and PSS: NICU (two days after hospitalization), because during this time, which is the beginning of the trial period for mothers, they adapted themselves to the new atmosphere and new

responsibilities. They may not yet be involved in the actual stress situation at which to a certain extent might influence the change of their QoL. The moderate level of stress encountered after the newborn's hospitalization was perceived by the mother as one of the difficulties during motherhood, which might improve mothers' ability to cope and alter their life to be better. Lastly, mothers might reveal about the recent or earlier quality of life as at that particular time mothers were in the altering stages and were not in the actual condition of the stress, and this probably had affected mothers' quality of life in the extended period of time. An extensive adjustment after the delivery, specifically in the case of an unexpected delivery, needs the mother to deal with different and challenging conditions; these stress-managing circumstances may have decreased the mother's quality of life (Noy et al., 2015).

The result also indicates that the PSS: MRA harms the mothers' QoL, which might be related to the majority of mothers studied being first-timers, as they might expect to take part in caring for their infant, which they could not fulfill. This result is in line with many researchers' suggestions that mothers of children with problems may be more susceptible to wellbeing problems and have a lower quality of life (Lee et al., 2009).

Implications of the Study

The study results serve as a guideline and reference to alert the health care providers, particularly the neonatal nurses, when providing support to mothers psychologically aspect, especially in terms of role change to ensure a better quality of life among the mothers whose newborn was admitted to NICU. The authors were aware of the outdated data; somehow, these findings must be disseminated as baseline data because, to date, there has been no such study done in this setting since 1994.

Limitations

This study has several limitations; initially, the information was gathered from one setting at a certain time by utilizing a non-probability convenience sampling, which may restrict the generalizability. In addition, the usage of the cross-sectional method significantly restricts more unexpressed and precise data. The addition of qualitative approaches that can foster openness and create personal events would have aided in describing the several Malay postnatal traditional practices and religion, hence would have significantly improved the value of the project.

Conclusion

In a nutshell, this study has revealed that mothers with hospitalized preterm newborns admitted to the NICU rated their quality of life at a moderate level. Working in government sectors and the PSS: MRA was found to be the most influential factor associated with the mothers' quality of life. This finding resulted in the suggestion that, in dealing with QoL-related issues among mothers with their preterm newborns in NICU, the health care providers, hospital management should give more attention in planning the strategies that can reduce maternal stress, especially on the PSS: MRA rather than tackling direct on the QoL, because with less stress the

mothers would either have a better or maintain the same level of QoL. Effective communication and attention should also be given in improving the QoL for mothers who were housewives and working in the private sector.

Declaration of Conflicting Interest

No conflict of interest to disclose by the researchers.

Funding

This study was funded by the Postgraduate Research Fund (PPP) PG047-2014B, University of Malaya, Malaysia.

Acknowledgment

The authors wish to widen our genuine appreciation to the Malaysian Ministry of Health, particularly the neonatal specialists and nurses in the Neonatal Intensive Care Unit, Hospital Sultanah Nur Zahirah, for their assistance shining our compilation process. We also wish to thank all the mothers who agreed to spend their time participating in this project. Thank you to the Postgraduate Research Fund of University Malaya, Malaysia. Lastly, we wish to convey our greatest appreciation to our collaborators for their countless support. This study would not be possible without their help.

Authors' Contributions

Study design: OSL, SKL, EH, SJ, PV; Data collection: OSL, SKL, SKG, AZ; Data analysis: OSL, EH, SKL, SJ; Manuscript writing: OSL, SKL, EH, PV, SKG; Critical revisions for important intellectual content: OSL, SKL, EH. All authors agreed with the final version of the article to be published.

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Cite this article as: Ong, S. L., Soh, K. L., Hussin, E. O. D., Japar, S., Soh, K. G., Vorasiha, P., & Daud, A. (2022). Quality of life among mothers of preterm newborns in a Malaysian neonatal intensive care unit. *Belitung Nursing Journal*, 8(2), 93-100. <https://doi.org/10.33546/bnj.1872>