EVENTS AND RISK FACTORS OF DEVELOPMENTAL DISORDERS IN LOW BIRTH WEIGHT BABIES

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ABSTRACT

The high incidence of low birth weight (LBW) and the various efforts to improve care will be extended survival, including low birth weight babies often have problems in developmental disorders. The impact of developmental disorders can be commuted if known early on and immediately given intervention. Early detection of developmental disorders of LBW in the first year of life using the Denver Development Test II (DDT II) and find the relation between the results of low birth weight with developmental disorders Birth Weight, gestation and head circumference. This research was conducted by cross sectional in BKIA CRS St. Vincentius a Paulo Surabaya with 80 samples of infants aged between one month - a year during the period January 1, 2006 until June 30, 2006. Sampling was done using the Random Sample Population Proportionate (PPRS). Interpretation of the development in accordance with the Denver Developmental Test II. The result showed that the 39 normal infants (48.75%), 17 babies can not be tested (21.25%) and 24 infants suspected (30%). Bivariate analysis showed that the deviation factor of the development of significant association with LBW BBL (80% BBL <1500 grams), gestation (61% gestation <30 weeks gestation and 40%> 42 weeks) and head circumference (54.55% circumference heads smaller than normal by Nellhaus). Developmental disorders, the incidence of LBW is still quite high, it is 30%. BBL, gestation and head circumference influenced the risk of developmental disorders in LBW.

Keywords: aberrations of development, low birth weight, DDT II.

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INTRODUCTION

The incidence of low birth weight (LBW) in BKIA CRS Vincentius a Paulo, Singapore, is still quite high, around 10% in 2005 and in 2006, according to National incidence estimated at 8-15% in 1990. Sedang di Amerika angka kejadian BBLR sekitar 7,6% pada tahun 2000 9 . Being in America, the incidence of LBW of about 7.6% in 2000 9.

One of the important problems that often occur in babies of low birth weight is developmental disorders that can affect behavior, intelligence, and Faculty achievement. In addition, developmental disorders also have an impact which is very harmful for economic families, communities and countries. In terms of psychology, families with children with developmental disorders is a heavy burden. This is what causes low birth weight is still a major health problem in both developing countries and in developed countries (Soetjiningsih 1995, Ranuh 1996, Als 2002, Needlman 2004, Bernbaum et al. 2005, Als & Butler 2006, Chan 2006).

In an effort to reduce the risk of developmental disorders child health guidance is needed as early as possible, especially during the first year of life because the period of most rapid brain development in children's lives occurred at the age of six first months of life until the age of one year (Soetjiningsih 1995, Ranuh 1996, Needlman 2004, Bernbaum et al. 2005). Besides, the development of social intelligence and emotion in the first year is a time sensitive and very fast, so most of the success of the first years of life can determine the future of children. Therefore, early detection of irregularities during a child's first year was very important third (Soetjiningsih 1995, Ranuh 1996, Needlman 2004).

To find out early developmental disorders, we need a screening test in low birth weight infants. One screening method to determine the possibility of developmental disorders is the Denver II test. This screening can be applied since the baby is born until the age of six years, which was first performed in Denver, Colorado in 1967 (Soetjiningsih 1995, Fadlyana 2005).

This study aimed to detect early developmental disorders incidence of LBW in the first year of life
using the Denver II test and find the relation between developmental disorders with birth weight LBW, gestation and head circumference.

MATERIALS AND METHODS

This research was conducted by cross sectional in BKIA CRS St. Vincentius a Paulo Surabaya during the period January 1, 2006 until June 30, 2006 with a sample of 80 infants aged between one month - one year, as well as acceptance and rejection criteria has been determined.

Acceptance criteria is that all babies of low birth weight (≤ 2500 grams BBL) polyclinics BKIA visitors a month old - one year (after the correction). Whereas low birth weight with birth complications, such as asphyxia and/or intracranial hemorrhage, congenital abnormalities, infection (sepsis, meningitis, TORCHS), seizures, jaundice, hypoglycemia, and pulmonary disorders were not included in the study.

Sampling was done using the Random Sample Population Proportionate (PPRS). Furthermore, the estimated sample size calculated based on the assumption of developmental disorders incidence of LBW (p) 0.20, bias / error (d) are 0.05 and level of significance $\alpha$ 0.05.

Written approval is given to mothers / caregivers before the study began. Data taken from questionnaires, reports the mother / caregiver and the Denver II test examination.

The independent variables in this study were sex, BBL (grouped into three namely BBL <1500 grams, 1500-2000 grams and BBL BBL 2001 to 2500 grams), gestation (grouped into five parts, namely <30 weeks, 30-34 weeks, 34-37 weeks, 37-42 weeks and> 42 weeks) and head circumference (Nellhaus curve). And the deviations of dependent variable is the development of the Denver test II (personal social, fine motor movement, gross motor movement, language).

Assessment score is (Soetjiningsih 1995, Fadlyana 2005) P, F, NO, and R. P is pass, the child can perform the task with good growth, or based on statements of the mother / caregiver that the child can complete tasks such development. F is fail, the child can not carry out development tasks, or the mothers / caregivers reported the child can not do the task. NO is no Opportunity / no chance, children never have the opportunity to conduct such tests. R is refusal, children who refuse to perform tasks diteskan developments.

Interpretation of the Denver II tests are normal, suspect, and untestable. Normal if there is no delay and / or at most one caution. Suspect if obtained $\geq$ 2 Caution and / or $\geq$ 1 delay. Untestable if there are scores declined in $\geq$ 1 test is adjacent.

In the left age lines or refuse $>$ first test which penetrated the line age in the region 75-90%. Statistical analysis was performed using Chi-square test, Fisher's Exact Test and the Spearman correlation test used to test the significance of the relationship between dependent variables and independent variables with significance level $\alpha$ of 0.05.

RESULTS

Of the 80 samples consisted of 40 male infants and 40 infants of women showed that the prevalence of developmental disorders in LBW rate of 30%. There was no significant difference in the incidence of developmental disorders among babies sex men and women (p> .05) (table 1).

<table>
<thead>
<tr>
<th>Denver II Test</th>
<th>Normal</th>
<th>Untestable</th>
<th>Suspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>15 (37.5%)</td>
<td>11 (27.5%)</td>
<td>14 (35%)</td>
</tr>
<tr>
<td>Female</td>
<td>24 (60%)</td>
<td>6 (15%)</td>
<td>10 (25%)</td>
</tr>
<tr>
<td>Total</td>
<td>39 (48.75%)</td>
<td>17 (21.25%)</td>
<td>24 (30%)</td>
</tr>
</tbody>
</table>

When viewed from the BBL developmental disorders, it was found that the lower the BBL, the greater the deviation of growth (table 2). Infants with BBL <1500 grams had a risk of developmental disorders 10 times greater than babies BBL group from 2001 to 2500 grams, while babies with BBL experience developmental disorders from 1500 to 2500 grams of seven times larger (Table 5).

<table>
<thead>
<tr>
<th>Birth Weight (gram)</th>
<th>Normal</th>
<th>Untestable</th>
<th>Suspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1500</td>
<td>1 (10%)</td>
<td>1 (10%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>1500 – 2000</td>
<td>6 (23.08%)</td>
<td>7 (26.92%)</td>
<td>13 (50%)</td>
</tr>
<tr>
<td>2001 – 2500</td>
<td>32 (72.73%)</td>
<td>9 (20.45%)</td>
<td>3 (6.82%)</td>
</tr>
<tr>
<td>Total</td>
<td>39 (48.75%)</td>
<td>17 (21.25%)</td>
<td>24 (30%)</td>
</tr>
</tbody>
</table>

Correlation test of Spearman $r_s = - 0.0612$ (p = 0.000, $S$).

Gestation also influence developmental disorders. This can be seen in infants with gestation <37 weeks and> 42 weeks experienced a greater risk of developmental disorders (p <0.005). The risk of infants with developmental disorders of gestation <30 weeks is 11
times greater when compared with gestation 37 - 42 weeks. Furthermore, gestation 30-34 weeks, 34-37 weeks of gestation, gestation> 42 weeks, are at risk for developmental disorders in a row for 5 times, 1.8 times, two times greater than 37-42 weeks gestation (table 3).

| Table 3. The Relationship Between Developmental Disorders and Birth Weight |
|-----------------------------|-----------------------------|
| No | Birth Weight | Denver II Test | PR | P       |
| 1 | < 1500 vs 2001-2500 | Normal vs Untestable | 2,278 | 0,415 |
| 2 | 1500 - 2000 vs 2001 - 2500 | Normal vs Untestable | 2,453 | 0,040 |
| 3 | < 1500 vs 2001-2500 | Normal vs Suspect | 10,370 | 0,000 |
| 4 | 1500 - 2000 vs 2001-2500 | Normal vs Suspect | 7,983 | 0,000 |

The amount of developmental disorders, the incidence of LBW was reported by several authors are not the same. Differences in incidence is influenced by several factors, BBL, gestation, head circumference, head circumference.
demographic and socio-economic, nutrition, neonatal intensive care unit (NICU), and complications of the disorder or a previous illness such as infection, hyperbilirubinemia, asphyxia, intracranial hemorrhage (Costello & Hack 2002, Bernbaum et al. 2005; Costello & Hack 2006, Marlow 2006). BJ Stoll and RM Kliegman (2004) found that the incidence of developmental disorders in infants with BBL <1500 grams of 30-50% 20. Other researchers Hendarto in Cipto Mangunkusumo SK in Jakarta (1978) showed that the prevalence of developmental disorders 38.4% 11. In this research found that the incidence of developmental disorders for 30% of low birth weight.

From this research we found that the lower the birth weight, the higher the risk of developmental disorders (p <0.000). This is in accordance with the Wilson & Hack's research (2002) that indicating the incidence of infants with developmental disorders BBL <1000 grams of 20%, further consecutive infants with BBL 1000 - 1499 amounted to 15%, and 8% in infants with BBL 1500-2499 grams 23. Other researchers Pederson and Markestad stated that 35% of infants with BBL <1000g had dystonia, 25% for infants with BBL 1000 - 1499 grams and then 21% for infants with BBL 1500-1999 grams 19. Mc Cormick et al. reported that infants with BBL <1500 grams experiencing developmental disorders three times more likely than babies of normal BBL, while infants with BBL 1500-2500 grams experienced developmental disorders 2 times greater when dibandingikan infants with normal BBL 14.15. Klebanov (1994) found that LBW had a risk of developmental disorders such as speech disturbance, language, perception and behavior problems greater than infants with normal BBL.

This study also showed that low birth weight is affected by developmental disorders of gestation, due to the lower stage of gestation, the more immature brain development (Brown 2005). It can be seen from our research that shows developmental disorders of 61.1% in infants with gestation <30 weeks. This situation is in accordance with the research in Melbourne and the North East of England which stated that infants with gestation <26 weeks had 20-25% risk of developmental disorders 19. Sung et al. (1993) in Korea was also reported that infants experience extreme gestational ages greater developmental disorders. Besides, we also find developmental disorders in infants with gestational > 42 minggu sebanyak 40%. > 42 weeks as much as 40%.

This is in accordance with Wagner's research stating that 28% of 100 children with cerebral palsy had a ≥ 41 weeks gestation. Westwood and Clifford found that the likelihood of developmental disorders are caused by poor placenta function so that children experience chronic hypoxia (Stewart & Roth 1999).

Head circumference reflects intracranial volume and used to assess brain growth. When the brain does not develop normally it will stay small head which resulted in developmental disorders (Tang & Yeung 1992). In this study we found that many developmental disorders occur in infants with smaller head circumference than normal that is equal to 30%. This research is supported by Hack et al. which found that smaller head circumference than normal until the age of eight months of the correction in infants with BBL <1500 grams would have a lower IQ scores than infants with normal head circumference 10. Other researchers Sung et al. (1993) also showed that infants with head circumference below the third percentile had lower cognitive functions.

Limitations of this study is the short time that research so that more investigation is needed longer to see further development of the child.

CONCLUSION

From this research can be concluded that the prevalence of LBW developmental disorders is still high enough that approximately 30%. Birth weight, gestation, and head circumference proved to be risk factors that influence developmental disorders.

REFERENCES


Costello DEW, Hack M. Follow-up for high-risk neonates. In: Fanaroff and Martin’s Neonatal Perinatal


