

## Correlation Preterm Infants Gestational Age and Birth Weight at one Medical Center at Banyumas Regency Indonesia

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### ABSTRACT

**Introduction:** Preterm infants commonly experience with low birth weight. Identifying preterm infants' gestational age and birth weight is pivotal to prevent intra uterine growth retardation and prevent case of LBW infants. **Aims:** To clarify the correlation between preterm infants' gestational age and birth weight. **Methods:** An observational study involving a convenience sample of 46 preterm infants who were born < 37 weeks gestation were taken from level 1,2,3 neonatal care at one medical center at Banyumas Regency, Indonesia. Data were retrieved from infants' medical record using a self-designed collection data sheet. Data were analyzed using univariate, Shapiro Wilk, and Spearman Rank test. **Result:** The preterm infants gestation age had moderate positive correlation with birthweight ( $r=.490$ ,  $p= 0.01$ ,  $n=46$ ). **Conclusion:** Increasing the maturity of preterm infants' gestation will effect on the increased of birth weight. It means that health care professional should give health education to mothers to reduce the high risk for preterm infants' delivery and reduce the risk of LBW infants.

### KEYWORDS

birth weight,  
gestational age,  
Indonesia, preterm  
infants

### INTRODUCTION

Preterm infants was infants born < 37 weeks gestational age. The previous study was conducted by Purwandari and Huang in one medical center at Banyumas Regency, Indonesia found the delivery of preterm infants reached 11% using the hospital database in 2015 (Purwandari & Huang, 2020). Although this finding is still low compared to Indonesia estimation prevalence rate by Blencowe, et al, that is more than 15% (Blencowe et al., 2013), this number is still high and needs attention from health care professional including pediatric nurses. Further, Indonesia contributed 4.5% of the global preterm birth in the world and this situation placed Indonesia as fifth country in the world with high number pf preterm infants (Blencowe et al., 2012). Previous study showed that preterm infants experienced with low birth weight or LBW (Celik, Demirel, Canpolat, & Dilmen, 2013; Purwandari & Huang, 2020). One of factors that contribute to low-birth-weight infants was prematurity. The preterm infant have chance 2.9 times to develop low birth weight

compare to term infant (KC, Basel, & Singh, 2020). Another study mentioned that preterm infants can be as LBW-preterm, moderate LBW-preterm, and normal birthweight preterm (Schieve et al., 2016).

Whereas, improving infants' weight for preterm infants is challenging for pediatric nurses who works in level 1, 2 or 3 neonatal care. Some preterm infants experienced feeding difficulty as much as 13.1% (Celik et al., 2013). Purwandari and Huang study found 74 % preterm infants experienced LBW, and preterm infants' hospital stay from 1 until 25 days with median 9 days (Purwandari & Huang, 2020). It seems that LBW will impact on the longer stay at hospital for preterm infants. Further, based on Fundamental Health Research in Indonesia 2019, the main cause for neonatal death (0-28 early day of life) is LBW that is accounting 35.3% (Ministry of Health Republic Indonesia, 2019)

Therefore, identify preterm infants' gestation and birth weight is pivotal to prevent fetus intrauterine growth retardation or LBW infants after delivery. Infants' weight is one of

indicators to measure infants' growth. Growth refers to increasing cell measurement including the increased number of cells (Purwandari, Mulyono, & Suryanto, 2014). The fetus and preterm infants' growth rates change dramatically with post-menstrual age. Less than 4 months, fetus from 24 weeks' until term, multiplying their weight amount 5 times (Fenton et al., 2013). It means that infants' growth weight increased along the time. However most of study including preterm infants from overseas such as USA (Schieve et al., 2016). In Indonesia, a limited study focus to assess the correlation between preterm infants' gestational age and infants' birth weight. Further, this study was intended to clarify the correlation between preterm infants' gestational age and birth weight involving Indonesian preterm infants'.

## RESEARCH METHOD

An observational study was used as the study design. A convenience sampling of 46 preterm infants who were born < 37 weeks' gestation were taken from one medical center that is owned by Central Java Province and located at Purwokerto Town, Banyumas Regency, Indonesia. Data were taken from patients' medical record from level 1 and 2 neonatal care. A self-designed collection data sheet was used as instrument. Univariate, Shapiro-Wilk, and Spearman Rank test were used as statistical analyzing. Data were collected from March-June 2017. The study was approved and passed reviewed by Margono Soekarjo Hospital ethic committee. Researchers keep respondents' data privacy using respondents' number code.

## RESULT AND DISCUSSION

This study was intended to clarify the correlation between preterm infants gestational age and birth weight using Indonesia preterm infants as samples. Since preterm infants gestational age an independent variabel was not in normal distribution after tested using Shapiro-Wilk test ( $p < 0.05$ ), researcher used Spearman

Rank to test the correlation between infants' gestational age and birth weight. The characteristic respondents can be seen in the table 1.

Table 1. Preterm Infants Characteristics (n=46)

Characteristics	Value
Gestational Age (weeks)	35.14 (26.71-36.86)
Sex	
Male	22 (47.8%)
Female	24 (52.2%)
Preterm Infants Category	
Extremely preterm (<28 weeks' GA)	2 (4.3%)
Very preterm (28-<32 weeks' GA)	4 (8.7%)
Moderate preterm (32-<34 weeks' GA)	7 (15.2%)
Late preterm infants (34-<37 weeks' GA)	33(71.7%)
Birth weight (gram)	2227.61± 70.24

It can be seen from Table 1 that the median age for preterm infants was 35.14 weeks' gestation and this gestational age belong to late preterm infants. In this study, the most majority respondents was categorized as late preterm infants (71.7%). Late preterm infants is infants born between 34<sup>0/7</sup> until 36<sup>6/7</sup> weeks' gestation (Karnati, Kollikonda, & Abu-Shaweesh, 2020). The previous study in this research site also found that most majority respondents was late preterm infants (Purwandari & Huang, 2020). This finding is reasonable since global data showed that the most majority subgroup of preterm infants were late preterm infants. Based on Millenium Developmental Goals area (MDG area), the Southern Asia had 13.8 % of preterm infants and tends to be the highest percentage compare to other MDG area and most of percentage of preterm infants was dominated by preterm infants aged 32-<37 weeks' gestation or moderate and late preterm infants (Blencowe et al., 2013; Blencowe et al., 2012). Late preterm infants is near term infants but physically different with term infants. Late preterm infants is still vulnerable physically due to their organ immaturity. Late preterm infants is high risk for

mortality and also experienced with some problem in longterm and neurodevelopmental outcomes (Karnati et al., 2020). The mean of preterm infants birth weight is categorized as LBW. Low birth weight is defined as infants delivery with birth weight <2500 gram (KC et al., 2020).

Table 2. Correlation between Preterm Infants Gestational Age and Birth Weight

Variables		Birth weight (gram)
Gestational (weeks)	Age	r=,490* p= 0.01 n=46

It can be seen from Table 2 that preterm infants gestational had moderate positive correlation with infants' birth weight. It means that more mature the infants gestational age when infants delivery, the higher their birth weight. In another world, if the infants delivery were to soon such as preterm infants, their will experience low birth weight. Researchers argued that LBW occurs because infants were born too early so they hadn't grown as weight as term infants who were born more mature. Delivering infants to soon such as preterm infants delivery will impact on interruption the connection or providing nutrition from the mother to the fetus through umbilical cord and effect on inadequate nutrition for infants. As a consequence will effect on the infants' birth weight.

Literatur mentioned that from 24 weeks' gestation, the fetus will multiply their weight until 5 times within 4 months (Fenton et al., 2013). It means that if the infants were born to soon, they will not have a chance to multiply their weight until 5 times to reach the appropriate birth weight. One study found that one of predictor factors for LBW condition is preterm birth. The preterm infants have chance 2.9 times to develop LBW compared to term infants (KC et al., 2020).

In utero, there is fetal circulation that

connecting with the maternal circulation through umbilical cord or is labelled as utero-placental circulation. Using this way, the nutrition from mother delivered to fetus and increased the fetus' weight gain over the time. Reducing the utero-placental circulation flow is found at intra uterine growth retardation case. It is clear that placenta has a key role for fetus growth and development (Pardi & Cetin, 2006). Literatures mentioned that changing the organ functioning of infants will increase over the time (Ball, Bindler, Cowen, & Shaw, 2012; Hockenberry & Wilson, 2018).

After preterm infants' delivery is challenge situation for pediatric nurses, since the infants also experienced with feeding difficult since problem in suck-swallow-breathing coordination and hypoglicemia (Celik et al., 2013). So, it is not easy for pediatric nurses to increase the preterm infants' weight after delivery. Whereas, ability to eat and weight gain stability is one of requirements to discharge preterm infants from hospital (Stark et al., 2008). Preventing the preterm delivery is a key to reduce risk for delivering LBW infants. Monitoring maternal weight gain is one of ways to improve maternal and neonatal outcomes (Rasmussen & Yaktine, 2009).

This study was part of the main project related mothers and preterm infants interaction. The study limitation is involving limited samples and using non probability sampling technique that may impact for representing the preterm infants' population.

## CONCLUSION AND RECOMMENDATION

This study found that preterm infants' gestation age was moderate positive correlation with the infants' birth weight after tested using Spearman Rank correlation. It means that more mature the preterm infants gestation when they were born, the infants' birth weight increased.

This study finding supports that preventing preterm delivery is pivotal to reduce the possibility preterm infants' birth with low birth

weight condition. Therefore, health care professional including pediatric nursing should be active in health education for preventing the preterm delivery to increase the preterm infants' outcomes.

## CONFLICT OF INTEREST

Researchers declared that they did not have a conflict of interest in this study.

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