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The influence of the Kangaroo Motherboard Care (KMC) against breast milk production, Bounding Attachment and The status baby Sleep in Hospital Dr. *Ramelan Surabaya Using Partial Square* (PLS)

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ABSTRACT

Premature infants have a risk high enough and can experience various complications such hipotermi and hyperglycemia. Low birth weight (LBW) maintenance of good quality can reduce the death of neonatal, such as incubator and attachments on the Neonatal Intensive Care Unit (NICU), but this technology is relatively expensive. Baby Care with the KMC method can be used as a replacement for maintenance with incubator. The purpose of this research is to know the influence of the action KMC against breast milk production, bounding attachment and the status of the baby sleep using PLS. The results of the study showed that the model is fit and has a high accuracy with the criteria R-square and Q-square. KMC *actions* increase breast milk production, bounding attachment and the status of the sleeping infant. The largest improvement occurs on the bounding attachment and the smallest on the status of a baby sleep.
KEYWORDS: *KMC, milk production, Bounding Attachment, PLS*

INTRODUCTION

Prematuritas and Low Birth Weight (LBW) usually occur simultaneously, especially in between the baby with the weight of the 1500 g or less when born. Both connected with rising morbidity and mortality neonates [1]. LBW babies is the new baby born underweight when born less than 2500 g (until 2400 g) that can occur when the result of prematuritas or small baby delivery pregnancy.. The baby has a low control threshold of environmental stimulus will be difficult to tolerate stimulation from the environment [2].

Birth is a moment that can form a bond between the mother and the baby. When the baby is born is a very astonishing for a mother when he can see, hold and give breast milk to her baby for the first time [3]. But in reality, often LBW baby and premature done separate treatment with his mother because it must be done so that the LBW baby incubator care and premature infants who indeed has the ability to suck the weak will have difficulty in this exercise absorbing [4].

Premature infants have a risk high enough and can experience various complications such hipotermi and hyperglycemia, therefore it is more difficult to live outside the uterus mother, more short age pregnancy progresses more and more or less flawlessly organ growth - the organs of his body with the result that the more easily the actualization of complications and the increasing number of death [5]. According to [6] isolation and separation with the parents will reduce the chances of interaction between parents with her baby and can cause stress on the interaction between the mother and the baby. This will affect the development of the parent relationship with the baby and can impede the development of baby [7]. The baby with LBW requires the environment that can help pursue grow flowers. The interaction with the parents is the most important factor [8]. Parents play the most dominant role in the life of a baby, first because the treatment in the hospital is temporary. Close interaction between children with parents must be started early, therefore maintenance need to develop various innovations to increase the closeness of the baby with his parents [9].

LBW maintenance of good quality can reduce the death of neonatal, such as incubator and attachments on the Neonatal Intensive Care Unit (NICU). But this technology is relatively expensive. Countries - developing countries such as Indonesion is faced with the problem of the lack of skilled labor, the cost of the maintenance of the appliance, and logistics. In addition the use of incubator considered to inhibit early contact mother - baby and breast feeding and resulting mother lack confidence and are not skilled in the baby care LBW [10]. The optimal temperature is obtained through direct contact the skin of the mother with the baby skin [11]. Close contact mother interaction of baby will make the baby feels comfortable and safe, as well as improve psychomotor development of the baby as the reaction of the sensory apparatus stimuli from the mother to the baby [12]. Baby Care with kangaroos method can be used as a replacement for maintenance with incubator. Kangaroos method KMC designed since 1978 by Edgar Rey and Hector Martine and very useful to treat the baby born with a heavy bada low birth and premature both at hospital and at home [13]. KMC is early treatment methods and continuously with a touch of the skin to the skin between the mother and premature infants and LBW in positions such as Kangaroos [11]. The implementation of KMC can be done on the baby immediately after birth, very early (after 10 - 15 minutes after being born), early (after age 24 hours), medium (after 7 days treatment), slow (after the baby breathe itself without the help of oxygen), after coming out of the incubator care [14]. In Rumkital dr Ramelan especially in the DIII, KMC can not be made posedur

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remains. Therefore this research examines whether KMC actions affect breast milk production, bounding attachment and the status of the baby sleep with this PLS approach. PLS is a method multivariat analysis based on the data does not have a distribution assumption, the scale of the measurement of the use of all types of the scale and the size of the small samples [15].

LITERATURE REVIEW

PLS is a method of analysis that continuing activity and often also called soft modeling because it removes the assumptions on Ordinary Least Square (OLS) [15]. The estimation is calculated by iteration, iterations will stop if has reached the condition of convergence [16]. In the path analysis model PLS consists of three sets of connection are:

1. Inner Model
   Inner model is a model that shows the relationship or the strength of the estimation between the latent variable or change based on substantive theory.
   Structural model equation is as follows.
   $$\eta = \boldsymbol{\beta}_0 + \boldsymbol{\beta}\eta + \boldsymbol{\Gamma}\xi + \zeta \quad (1)$$
   With $\boldsymbol{\eta}$ the vectors of change of endogen, $\boldsymbol{\xi}$ the vectors of change relatively exogenous and $\boldsymbol{\zeta}$ Is the vectors of residual variable.
2. Outer Model
   Outer model is a model that shows how each indicator variables related with latennya variable. Equation model for outer reflective model is:
   $$\mathbf{x} = \boldsymbol{\Lambda}_x \, \xi + \delta_x \quad (2)$$
   $$\boldsymbol{y} = \boldsymbol{\Lambda}_y \, \boldsymbol{\eta} + \boldsymbol{\varepsilon}_y \quad (3)$$
3. Weight Relations
   The weight of the link is the weight that connects outer and inner model to form the estimation of exogenous and endogenous latent variables.

Model evaluation consist 2 steps are an evaluation of the measurement model and structural model evaluation as follows [16].

1. The evaluation Measurement Model

The measurement model evaluation is done to determine the validity and reliability of the model. Evaluation of the measurement model as follows.

a. Convergence Validity

The convergence validity is used to know the validity of each indicator in the model, with can be seen from the values of *loading factor* $\geq$ 0.5 [17].

b. Discriminant Validity

The discriminantvalidity the related with indicator variable from construct is different from each other not correlate. The discriminantvalidity of reflective model can be evaluated with the *cross loading* from each indicator. This method considers the correlation between indicator (*loading factor*) with construct and constructothers [17].

c. Composite Reliability

The estimation of the structural path tends to be more accurate for the change score mengestimasi. The reliability of the latent variable which is estimated by the PLS, more recommended by composite reliability [16]. Composite reliability is used to evaluate the steps in building internal reliability consistency. The formula that can be used are as follows [17].

$$\rho_c = \frac{\left(\sum_i^k \lambda_i\right)^2}{\left(\sum_i^k \lambda_i\right)^2 + \sum_i^k \left(1 - \lambda_i^2\right)} \quad (4)$$

2. The evaluation Structural Model

Structural models are evaluated in view of the significance of the relationship between the change (latent variable). The value of the significance of the change can be seen from the value of the t test (critical ratio) bootstrapping process. The model can be stated to have the goodness of fit if has a value $R^2 > 0$ and the value of $Q^2 = 1 - (1 - R_1^2)(1 - R_2^2)(1 - R_3^2) > 0.35$ provides high accuracy [15][18].

METHODOLOGY

In this study using *Quasi-Experimental Design* with *One Group Pre Test and Post Test Design* with how to perform the measurement on the sample group who performed the actions both before and after the intervention of the KMC [19]. The research done by observation of respondents before KMC and perform and then observe the results after KMC. The Research sample is a baby born premature (LBW) in space neonates DIII Dr Ramelan Surabaya with that meet the criteria for the inclusion of the method with simple random sampling [19], follows:

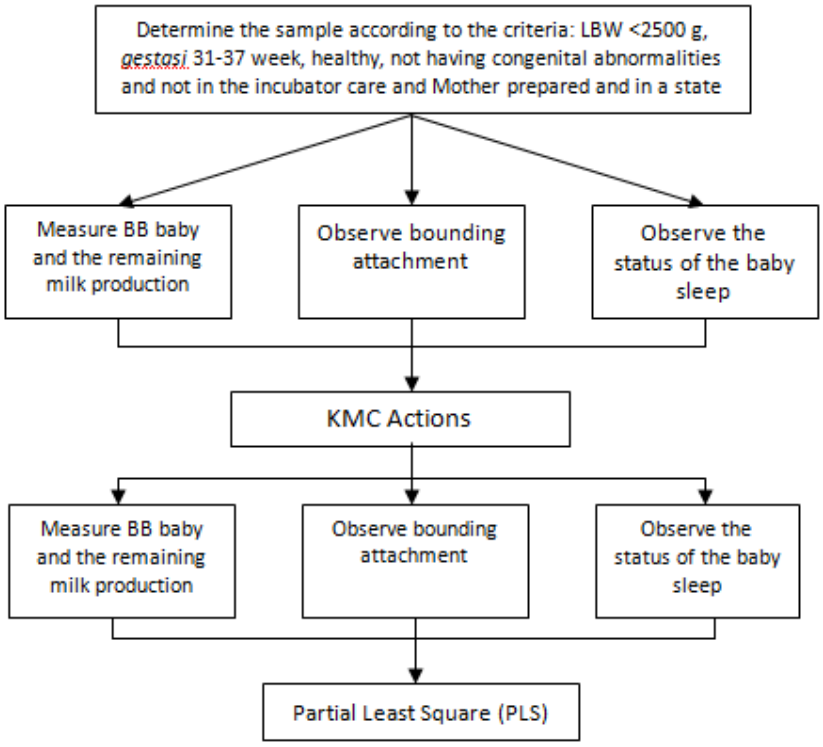

Figure 1. The framework of the concept of KMC action [10]

Analysis of the steps that will be done to achieve the goal of research using PLS is doing coefficient estimate weight, path, and loading, hypothesis test with the bootstrap approach and get the best model. Outer Model, covers the validity test is seen from the results of loading factor, and reliability tests seen from the value of Composite reliability. The indicator is called valid if has a value of loading factor > 0.5, and said reliable if the value of composite reliability > 0.6. Inner Model, test this can be seen as a result of the value of the inner weight to test the research hypothesis through t test on the bootstrap samples and goodness of fit model [15][16][17][18][20].

RESULTS AND DISCUSSION

The measurement of the model consists of a validity test and reliability test. The results are presented in detail in the following table.

Table 1. Validity and reliability test of the indicators on the latent Variable

LatentVariables	Indicator	Loading Factor Rotation 1	The validity of the		*Composite Reliability (C-R)*
			Loading Factor	T-Statistics	
Baby demographics	The age of the baby Gestasi (DB1)	0.842	0.842	7.157	0.795
	The Baby Weight (DB2)	0.567	0.567	3.577	
	Gender Baby (DB3)	0.824	0.824	13.186	
ThisdemographicMother	The age of the Mother (IN1)	0.733	0.603	10.578	0.802
	Price parity (IN2)	0.356			
	Education (IN3)	0.187			
	The experience of premature infants (IN4)	0.580	0.756	25.584	
	The type of birth (IN5)	0.833	0.898	43.887	
Kangaroo Care (KMC Motherboard)	Action_KMC KMC (T)	1000	1000		1000
Breast milk production	The production of breast milk (Y1)	1000	1000		1000
Bounding Attachment	Bounding Attachment (Y2)	1000	1000		1000
The status of the baby Sleep	The status of the baby sleep (Y3)	1000	1000		1000

Table 1. shows that the value of loading factor of the first round there are several indicators that are not valid, parity (D_I2) and mother education (D_I3), so that the indicator is removed from the model. The value of loading factor and T-statistics after the indicator is not valid remove each latent variable is greater than 0.5 and greater than T-table = 1.96, then all said indicator is valid and significant in forming the latent variable. While for the reliability of the Table 1 also shows that the latent variable demographic baby (D_B), demographic Mother (D_I), KMC, milk production, bounding attachment, and

the status of the baby sleep gives the value of Composite Reliability (C-R) above the value of the cut-off his 0.7 it can be said all the latent variable reliabel.

Structural Model PLS with the bootstrap partition to test the research hypothesis test through t and bootstrap stop if between the estimates of the original and the bootstrap estimates have values that approach. The results of the original estimates and estimates of the bootstrap, B=150 served on the following image.

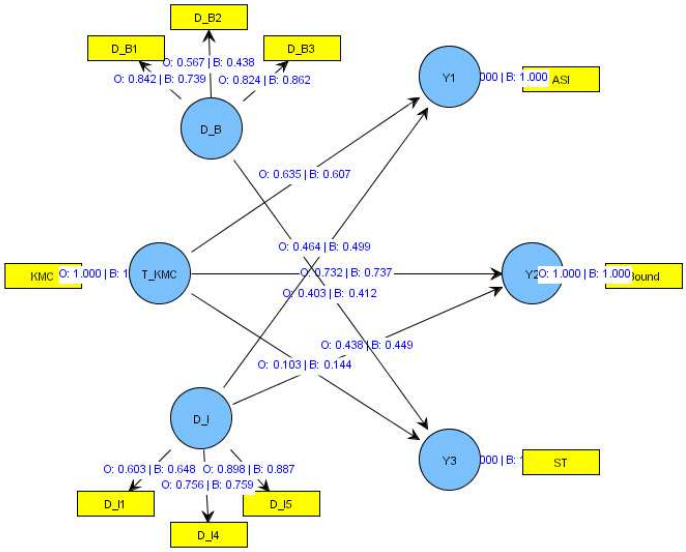

Figure 2.

The relationship of demography baby, demographic Mother, KMC with Milk Production, Bounding attachment, and Status Baby Sleep

The test results of the full model can be seen from the values R^2 that illustrates goodness of fit model. The value of R^2that is recommended is greater than zero. The value of R^2presented in Table 2.

Table 2. *Goodness of Fit* Model Response Variable

Exogenous variable → Endogenous Variable	***R-Square***
Demographic Mother (D_I), KMC Action (T_KMC)→Milk production (Y1)	0.618
Demographic Mother (D_I), KMC Action (T_KMC)→ Bounding Attachment (Y2)	0.727
Demographic Baby (D_B), KMC Action (T_KMC)→ Baby Sleep Status (Y3)	0.173

Table 2 explains that the donation or the proportion of demographic Mother (D_I), KMC Action (T_KMC) in explaining the variations around the variables breast milk production (Y1) of 0.618, further contributions or the proportion of demographic Mother (D_I), KMC Action (T_KMC) in explaining the variations around the variables bounding attachment (Y2) of 0.727, and contributions or the proportion of demographic Baby (D_B), KMC Action (T_KMC) in explaining the variations around the baby sleep status (Y3) variable of 0.173 . All values R-square greater than zero means that the model of this research is already meet the goodness of Fit is required, while the value of Q^2 = 0.914, it means that the model of breast milk production (Y1), bounding attachment (Y2) and the status of the baby sleep (Y3) have high accuracy.

Figure 2 can be interpreted each path coefficient. The coefficient of the path coefficient is the hypothesis in research that can be performed in the following structural equation:

Y1 = 0.464 D_I + T_KMC 0.635, R2 = 0.618

Y2 = 0.438 D_I + T_KMC 0.732, R2 = 0.727

Y3 = 0.403 D_B + T_KMC 0.103, R2 = 0.173

The results of the structural path coefficient along with the value of the full significance is shown in Table 3.

Table 3: Test *inner weight* on Model Response Variablewith the bootstrap samples (B=150)

Exogenous variable → Endogenous Variable	**Coeficient Orginal**	**The BOOTSTRAP samples (B=150)**		
		Coefficient	**T - Statistics**	**Description**
Demographic Mother (D_I) → Milk production (Y1)	0.464	0.499	12.860	Significant
KMC_ Action (T_KMC) → Milk production (Y1)	0.635	0.607	10.644	Significant
Demographic Mother (D_I) →bounding attachment (Y2)	0.438	0.449	6.193	Significant
KMC_ Action (T_KMC)→bounding attachment (Y2)	0.732	0.737	44.578	Significant
Demographic Baby (D_B) → Baby Sleep Status (Y3)	0.403	0.412	35.956	Significant
KMC_ Action (T_KMC)→ Baby Sleep Status (Y3)	0.103	0.144	2.256	Significant

Based on the table 3, interpretation of each path coefficient is as follows:

- This demographic Mother (D_I) have positive and significant impact on the production of breast milk (Y1). This can be seen from the path marked by the positive coefficient of 0.464 with T statistics of 12.860 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Thus the Demographic Mother (D_I) directly impact on the production of breast milk (Y1) of 0.464, which means that every there is increasing Demographic Mother (D_I) then there is increased production of breast milk (Y1) of 0.464.
- KMC_ Action (T_KMC) have positive and significant impact on the production of breast milk (Y1). This can be seen from the path marked by the positive coefficient of 0.635 with T statistics of 10.644 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Thus the KMC_ Action (T_KMC) directly impact on the production of breast milk (Y1) of 0.635, which means that every increase in the KMC_ Action (T_KMC) then will increase the production of breast milk (Y1) of 0.635.
- This demographic Mother (D_I) have positive and significant impact on the Bounding attachment (Y2). This can be seen from the path marked by the positive coefficient of 0.438 with T statistics of 6.193 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Thus the Demographic Mother (D_I) directly impact on the Bounding attachment (Y2) of 0.438, which means that every increase in the Demographic Mother (D_I) then will raise the Bounding attachment (Y2) of 0.438.
- KMC_ Action (T_KMC) have positive and significant impact on the Bounding attachment (Y2). This can be seen from the path marked by the positive coefficient of 0.732 with T statistics of 44.578 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Thus the KMC_ Action (T_KMC)directly impact on the Bounding attachment (Y2) of 0.732, which means that every increase in the KMC_ Action (T_KMC) then will raise the Bounding attachment (Y2) of 0.732.
- Demographic Baby (D_B) have positive and significant impact on baby sleep status(Y3). This can be seen from the path marked by the positive coefficient of 0.403 with T statistics of 35.956 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Demographic Baby (D_B) directly impact baby sleep status(Y3) of 0.403, which means that every increase in the Demographic Baby (D_B) then will raise the baby sleep status(Y3) of 0.403.
- KMC_ Action (T_KMC) have positive and significant impact on baby sleep status(Y3). This can be seen from the path marked by the positive coefficient of 0.103 with T statistics of 2.256 value greater than t table = 1.96 from equal significance (α) determined by 0.05. Thus the KMC_ Action (T_KMC) directly impact on baby sleep status(Y3) of 0.103, which means that every increase in the KMC_ Action (T_KMC) then will raise baby sleep status(Y3) of 0.103.

CONCLUSION

The results of the study showed that the baby demographics that consists of Age *Gestasi*, body weight and gender is indicator is valid and reliable, while on the maternal demographics, indicator is valid and reliable is the age of the mother, experience premature infants, and the type of birth. The influence of the baby demographics, demographics and KMC action against breast milk production, bounding attachment and the status of the baby sleep using PLS shows that the model is fit and has a high accuracy with the criteria R-square and Q-square. KMC action turns to increase production of breast milk, bounding attachment and the status of the baby sleep. The largest increase occurred on the bounding attachment and the smallest on the status of a baby sleep.

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