

# Oral Care Colostrum Effect on Preterm Infants Fecal Immunoglobulin A Secretory Level

*by* Eko Wahyudi

---

**Submission date:** 06-Oct-2021 09:53AM (UTC+0800)

**Submission ID:** 1666439911

**File name:** ct\_on\_Preterm\_Infants\_Fecal\_Immunoglobulin\_A\_Secretory\_Level.pdf (877.79K)

**Word count:** 2287

**Character count:** 12141

# Oral Care Colostrum Effect on Preterm Infants Fecal Immunoglobulin A Secretory Level

Eko Wahyudi<sup>1</sup>, Martono Tri Utomo<sup>2</sup>, Risa Etika<sup>2</sup>

<sup>1</sup>Resident in Department of Child Health, Faculty of Medicine, Universitas Airlangga/ Dr. Soetomo General Hospital, Surabaya, Indonesia, <sup>2</sup>Lecturer and Consultant in Neonatology Division Department of Child Health, Faculty of Medicine, Universitas Airlangga/ Dr. Soetomo General Hospital, Surabaya, Indonesia

## Abstract

**Objective** To evaluate whether oral care colostrum can increase fecal secretory immunoglobulin A levels in preterm infants.

**Methods** Thirty-eight infants who met the inclusion criteria were randomized. Twenty colostrum oral care infants and eighteen control control infants. Colostrum oral care by giving as much as 0.1 ml of colostrum on each buccal mucosa for approximately 2 minutes on one side. The procedure is repeated every 4 hours for 3 days. Fecal secretory immunoglobulin A levels are taken from the first faecal after birth and 72 hours after colostrum administration. Fecal retrieval must first install a urine device so that the urine does not wet the sample.

**Result** Fecal secretory immunoglobulin A level before treatment in the treatment group were  $0.0633 \pm 0.0037$  mg/g feces higher than the control group  $0.0166 \pm 0.0139$  mg/g feces, statistically there were no significant differences ( $p = 0.595$ ). Fecal secretory immunoglobulin A level after treatment in the treatment group amounted to  $1.1007 \pm 0.2458$  mg/g feces higher than the control group  $0.6045 \pm 0.2358$  mg/g faeces, statistically there were no significant differences ( $p = 0.09$ ). Difference in increase in secretory fecal immunoglobulin A levels after and before treatment in the treatment group  $1.0374 \pm 0.2575$  mg/g feces is higher than the control group  $0.5879 \pm 0.2385$  mg/g feces, statistically there were no significant differences ( $p = 0.09$ ).

**Conclusion** Oral care colostrum has been shown to increase secretory immunoglobulin A levels in preterm infants before colostrum oral care, and colostrum oral care has the potential to increase faecal secretory immunoglobulin A level than controls in preterm infants.

**Keywords:** oral care colostrum, fecal immunoglobulin A secretory, preterm infants

## 7 Introduction

Preterm birth defined as every baby born before 37 weeks of pregnancy and is subcategorized in to 3 groups,

### Corresponding author:

**Risa Etika,**

is Doctoral in Department of Child Health, Faculty of Medicine, Universitas Airlangga/ Dr. Soetomo General Hospital. Jl. Mayjen Prof. Dr. Moestopo No. 47, Airlangga, Surabaya, East Java, Indonesia (+62 31) 5501681, E-mail: risa.etika@fk.unair.ac.id

5 extreme preterm (< 28 weeks), very preterm (28-32 weeks), late preterm (32-37 weeks). In 2014, Indonesia become fifth most country in term of preterm birth after India, China, Nigeria, and Bangladesh with 10.4 % of all births delivered.<sup>1</sup> Vernix caseosa, the sebaceous gland in infant for hydrating skin, maintaining pH, and containing antimicrobial protein and peptides (APP)<sup>2</sup>, is not presented in preterm infant.

Secretory Immunoglobulin A (sIgA) has been identified in breast milk as an antibody recognizing various bacterias and viruses, including *E. coli*, *Shigella*, *Salmonella*, *Campylobacter pylori*, *Vibrio cholerae*,

*Haemophilus influenzae*, *Streptococcus pneumoniae*, *Grup B Streptococcus tipe III*, *Staphylococcus aureus*, *Clostridium difficile*, *Clostridium botulinum*, *Klebsiella pneumoniae*, *Listeria monocytogenes*, *enterovirus*, human immunodeficiency virus (HIV), Respiratory Syncytial Virus (*RSV*), Rubella, Norovirus, and porcine corona virus.<sup>3</sup> sIgA in breast milk are mainly produced by plasma cells in mammary gland and modified in entire mammary gland epithelium translocation. Nearly 75% of Ig A processed in GI tract are remained and secreted along with feces. Every type of immunoglobulin is identified in feces.<sup>4</sup>

Oral care colostrum is a new concept for preterm infant as a natural substitution for amniotic fluid exposure. This will create an interaction between colostrum and the immunity cells in oropharyngeal lymphoid glands.<sup>5</sup> This procedure may improve immunity system in different ways, including immunostimulant effect of cytokines interaction with OFALT immune cells, passive mucosal absorption of protective immune and trophic biofactors (TGF- $\beta$ , lactoferrin), barrier protection against oropharyngeal pathogens, oligosaccharide systemic and local effect, and protective effect against antioxidant.<sup>5,6</sup>

Two previous studies showed the safety and tolerability of oral care colostrum in preterm infant both with buccal swab<sup>7</sup> and syringe<sup>8</sup>. A retrospective study reported that oral care colostrum is associated with increased breastfeeding rate, faster full feed achieved, increased growth, reduced NEC incident, and reduced late-onset sepsis.<sup>9</sup> Another randomized study reported lower clinical sepsis incidence, increased proinflammatory and immune protective factors (including Urine IgA, lactoferrin, IL-1 $\beta$ , and saliva's TGF- $\beta$ 1 and IL-8).<sup>10</sup> The authors aim to evaluate the effect of oral care colostrum on fecal secretory IgA level increment in preterm infant.

### Materials and Methods

This experimental study was conducted at Neonatal Intensive Care Unit (NICU), Dr. Soetomo General Hospital, Malang, Indonesia. Data were collected during April 2019 to August 2019. The inclusion criteria were baby who were born before 34 weeks of pregnancy and under 2000 gram of birth weight. The exclusion criteria were baby who had multiple congenital anomaly and had contraindication to be given colostrum because of

mother's condition. Total of 38 preterm infants were met the inclusion criteria and divided into 2 groups (20 treatment group and 18 control group) randomly. We compared the fecal secretory IgA level in infant before and after oral care colostrum administration. We also compared the fecal secretory IgA level in infants who were given oral care colostrum administration and were not (control). The Institutional Review Board had reviewed and approved this study with ethical clearance No: 1187/KEPK/V/2019.

Sample used in the study were subject first feces collected after birth and 72-hour post colostrum administration feces. The fecal secretory Ig A level were measured using Enzyme Linked Immuno Assay (ELISA) technique read by 490 nm biorad spectrophotometry reader. The first data (before and after) were compared using Wilcoxon test and the second data (treatment and control) were compared using Mann-Whitney test. All statistical analysis was conducted using SPSS 21 Software.

### Results and Discussion

Based on homogeneity test, gender, gestational age, apgar score, birth weight, mother's age, parity, mode of delivery, history of PROM, and amnion color were homogeneous ( $p > 0.05$ ) (Table 1). The fecal secretory Ig A level before intervention ( $0.0633 \pm 0.0037$  mg/g) was higher than control group ( $0.0166 \pm 0.0139$  mg/g), did not differ statistically ( $p = 0.595$ ). Meanwhile, the fecal secretory Ig A level after intervention ( $1.1007 \pm 0.2458$  mg/g) was higher than control group ( $0.6045 \pm 0.2358$  mg/g), did not differ statistically ( $p = 0.09$ ). Moreover, fecal secretory Ig A level difference in intervention group ( $1.0374 \pm 0.2575$  mg/g) was higher than control group ( $0.5879 \pm 0.2385$  mg/g), also did not differ statistically ( $p = 0.09$ ) (Table 2).

Furthermore, Fecal secretory Ig A level before intervention was increased after colostrum administration ( $0.0633 \pm 0.0037$  mg/g,  $1.1007 \pm 0.2458$  mg/g, respectively), significantly different ( $p < 0.001$ ). On the other hand, fecal secretory Ig A level in control group before and after intervention was also significantly different ( $p = 0.039$ ) ( $0.0166 \pm 0.0139$  mg/g,  $0.6045 \pm 0.2358$ , respectively) (Table 3).

Studies reported that the sIgA level is affected by many ways. Baby boy tend to have higher sIgA level than baby girl.<sup>11</sup> Gestational age also has important role in the sIgA level. 29 weeks of gestational age has the highest sIgA level.<sup>11</sup> Very preterm infant (28-32 weeks) also has the higher sIgA level than late preterm (32-37 weeks) ( $p < 0.05$ ).<sup>12</sup> Furthermore, mother younger than 30 y.o. tend to have more sIgA level.<sup>11</sup> These show that sample characteristics play a role in secretory Ig A level in preterm infant.

Data showing the higher level of fecal secretory Ig A in preterm infant before intervention than the control group may be associated with more infants who were born less than 1500 gram in intervention group than control group. This finding is in accordance to the

previous study showed that breast milk sIgA in very low birth weight infant was higher.<sup>11</sup> Moreover, this result may be associated with parity factor because intervention group has more primigravida mother than the control group, consistent with previous study that show higher colostrum IgA level in primigravida mother than multigravida.<sup>13</sup>

GI tract microflora stimulating either humoral or cellular immune system formation in mucose may be associated with the result of this study.<sup>14</sup> Other study also showed that fecal sIgA level in newborn who did not get breastfeed was found after prebiotic and probiotic administration.<sup>15</sup> Our study results are also similar to other study reporting that colostrum administration did not have any effect on the urine IgA level.<sup>16</sup>

**Table 1. Sampling Characteristics**

		Oral care kolostrum (n=20)	Plasebo (n=18)	P
Sex				
	Male (n)	14	11	0,815
	Female (n)	6	7	
Gestation Age				
	< 32 weeks (n)	4	3	1,000
	≥ 32 weeks (n)	16	15	
Apgar score				
1'	3-7 (n)	17	17	0,676
5'	7-9 (n)	12	13	0,652
Birth Weight				
	<1500 gram (n)	13	6	0,104
	≥1500 gram (n)	7	12	
Mother Age				
	< 35 years	15	10	0,358
	≥ 35 years	5	8	
Paritas				
	Primigravida	11	5	0.171
	Multigravida	9	13	
Pre Eklamsia /Eklamsia				

**Cont... Table 1. Sampling Characteristics**

	Yes	9	12	0,310
	No	11	6	
Labour Methode				
	Pervaginam	1	3	0,328
	SC	19	15	
Premature Rupture				
	Yes	4	2	0,761
	No	16	16	
Amnion Fluid				
	Clear	19	18	1,000
	Meconial	1	0	

**Table 2. Fecal Secretory IgA (sIgA) Mean**

	fekal sIgA Mean (mg/g)		p
	Oral care colostrum	Control	
Before treatment	0,0633 ± 0,0037	0,0166 ± 0,0139	0,595
After treatment	1,1007 ± 0,2458	0,6045 ± 0,2358	0,090
Difference sIgA	1,0374 ± 0,2575	0,5879 ± 0,2385	0,099

**Table 3. Fecal Secretory Ig A Mean Before and After Intervention**

	fekal sIgA Mean (mg/g)		p
	Before treatment	After treatment	
Oral care colostrum	0,0633 ± 0,0037	1,1007 ± 0,2458	<0,001*
Control	0,0166 ± 0,0139	0,6045 ± 0,2358	0,039*

### Conclusion and Acknowledgement

Oral care colostrum is proven to increase the fecal sIgA level in preterm infant after administration than before administration. However, oral care colostrum is not proven to increase significantly the fecal sIgA level in preterm infant than the control group.

**Source of Funding :** self

**Conflict of Interest :-**

### References

1. Chawanpaiboon S, Vogel JP, Moller A-B, Lumbiganon P, Petzold M, Hogan D, et al. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. *The Lancet Global Health*. 2019;7(1):e37-e46.
2. Levy O. Innate immunity of the newborn: basic mechanisms and clinical correlates. *Nature Reviews*

- Immunology. 2007;7(5):379-90.
3. Noguera-Obenza M, Cleary TG. The role of human milk secretory IgA in protecting infants from bacterial enteritis. *Advances in nutritional research*; Springer; 2001. p. 213-29.
  4. Remington J. "Current Concepts of Infections of The Fetus and Newborn Infant". In : J. Remington, J. Klein (Ed). *Infectious Diseases of The Fetus and Newborn Infant*. 5th. ed. WB Saunders. Philadelphia.2001:1-69.
  5. Rodriguez NA, Meier PP, Groer M, Zeller JM. Oropharyngeal administration of colostrum to extremely low birth weight infants: theoretical perspectives. *Journal of Perinatology*. 2009;29(1):1-7.
  6. Bocci V. Absorption of cytokines via oropharyngeal-associated lymphoid tissues. *Clinical pharmacokinetics*. 1991;21(6):411-7.
  7. Montgomery D, Baer V, Lambert D, Christensen R. Oropharyngeal administration of colostrum to very low birth weight infants: results of a feasibility trial. *Neonatal Intensive Care*. 2010;23(1):27-9.
  8. Rodriguez NA, Meier PP, Groer MW, Zeller JM, Engstrom JL, Fogg L. A pilot study to determine the safety and feasibility of oropharyngeal administration of own mother's colostrum to extremely low birth weight infants. *Advances in neonatal care: official journal of the National Association of Neonatal Nurses*. 2010;10(4):206.
  9. McCallie K, Lee H, Mayer O, Cohen R, Hintz S, Rhine W. Improved outcomes with a standardized feeding protocol for very low birth weight infants. *Journal of perinatology*. 2011;31(1):S61-S7.
  10. Lee J, Kim H-S, Jung YH, Choi KY, Shin SH, Kim E-K, et al. Oropharyngeal colostrum administration in extremely premature infants: an RCT. *Pediatrics*. 2015;135(2):e357-e66.
  11. Groer M, Ashmeade T, Duffy A, Morse S, Zaritt J. Changes in the immune components of preterm human milk and associations with maternal and infant characteristics. *Journal of Obstetric, Gynecologic & Neonatal Nursing*. 2016;45(5):639-48.
  12. Broadhurst M, Beddis K, Black J, Henderson H, Nair A, Wheeler T. Effect of gestation length on the levels of five innate defence proteins in human milk. *Early human development*. 2015;91(1):7-
  13. Striker GA, Casanova LD, Nagao AT. Influência do tipo de parto sobre a concentração de imunoglobulinas A, G e M no colostro materno. *Jornal de Pediatria*. 2004;80(2):123-8.
  14. Cebra JJ. Influences of microbiota on intestinal immune system development. *The American journal of clinical nutrition*. 1999;69(5):1046s-51s.
  15. Bakker-Zierikzee A, Van Tol E, Kroes H, Alles M, Kok F, Bindels J. Faecal SIgA secretion in infants fed on pre-or probiotic infant formula. *Pediatric Allergy and Immunology*. 2006;17(2):134-40.
  16. Zhang Y, Ji F, Hu X, Cao Y, Latour JM. Oropharyngeal colostrum administration in very low birth weight infants: a randomized controlled trial. *Pediatric Critical Care Medicine*. 2017;18(9):869-75.

# Oral Care Colostrum Effect on Preterm Infants Fecal Immunoglobulin A Secretory Level

## ORIGINALITY REPORT

9%

SIMILARITY INDEX

8%

INTERNET SOURCES

8%

PUBLICATIONS

1%

STUDENT PAPERS

## PRIMARY SOURCES

- |   |   |    |
|---|---|----|
| 1 | <a href="http://wrap.warwick.ac.uk">wrap.warwick.ac.uk</a><br>Internet Source   | 2% |
| 2 | Submitted to Universitas Airlangga<br>Student Paper   | 1% |
| 3 | <a href="http://d-scholarship.pitt.edu">d-scholarship.pitt.edu</a><br>Internet Source   | 1% |
| 4 | Muhtarum Yusuf, Yuan Ariawan Kusuma, Dwi Reno Pawarti. "Matrix Metalloproteinase-9 Expression and Status of Cervical Lymph Nodes in Patients with Nasopharyngeal Carcinoma", Indian Journal of Otolaryngology and Head & Neck Surgery, 2018<br>Publication                      | 1% |
| 5 | Chukwuemeka Iyoke, Lucky Lawani, Euzebus Ezugwu, Gideon Ilechukwu, Peter Nkwo, Sunday Mba, Isaac Asinobi. "Prevalence and perinatal mortality associated with preterm births in a tertiary medical center in South East Nigeria", International Journal of Women's Health, 2014 | 1% |

Publication

---

**6** **mafiadoc.com** 1 %  
Internet Source

---

**7** **network.bepress.com** 1 %  
Internet Source

---

**8** **panafrican-med-journal.com** 1 %  
Internet Source

---

---

Exclude quotes On

Exclude matches Off

Exclude bibliography On



# Oral Care Colostrum Effect on Preterm Infants Fecal Immunoglobulin A Secretory Level

---

GRADEMARK REPORT

---

FINAL GRADE

**/100**

GENERAL COMMENTS

**Instructor**

---

PAGE 1

---

PAGE 2

---

PAGE 3

---

PAGE 4

---

PAGE 5

---