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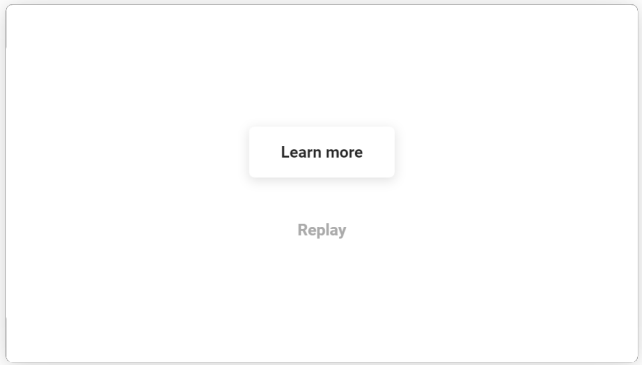

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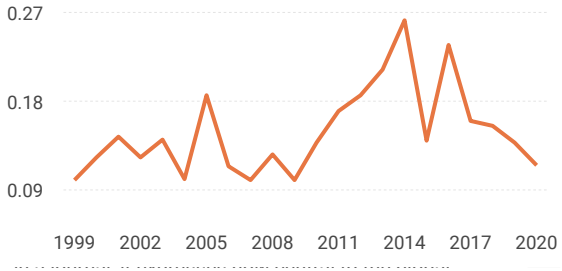

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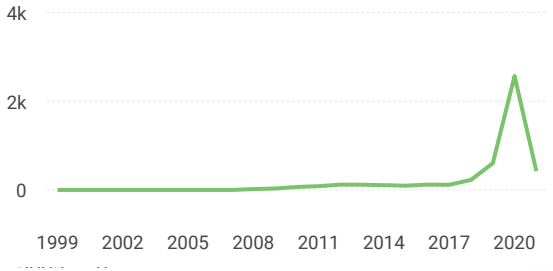

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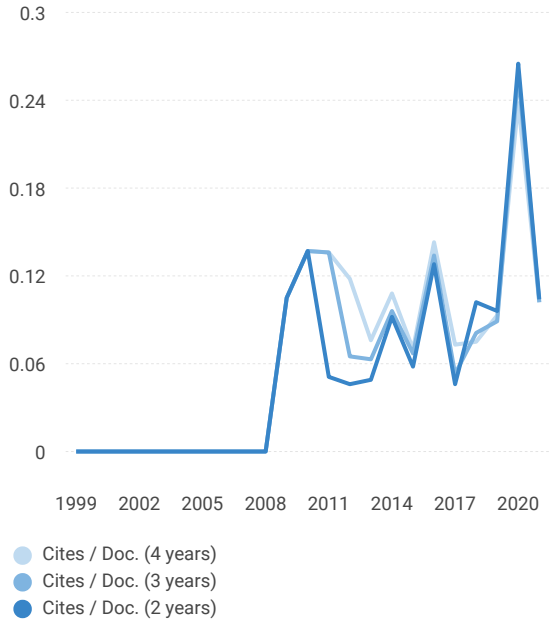

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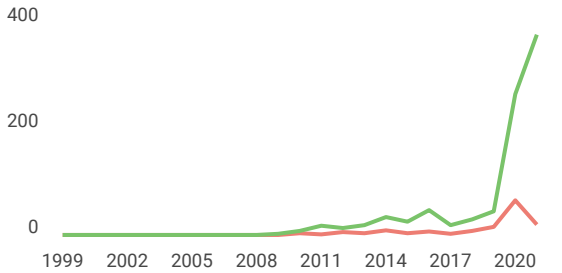

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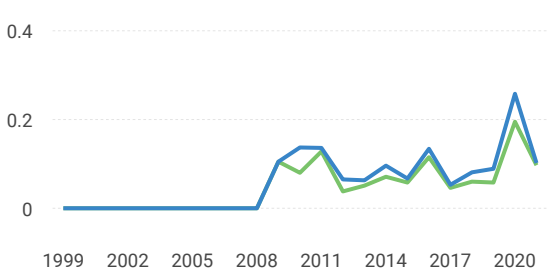

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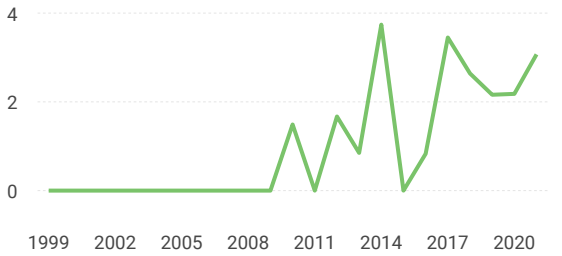

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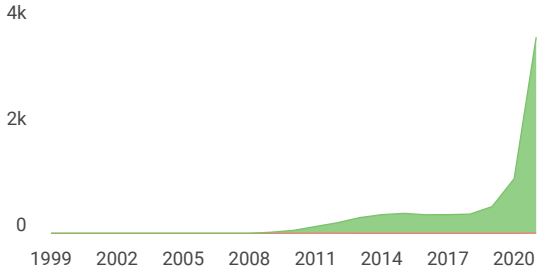

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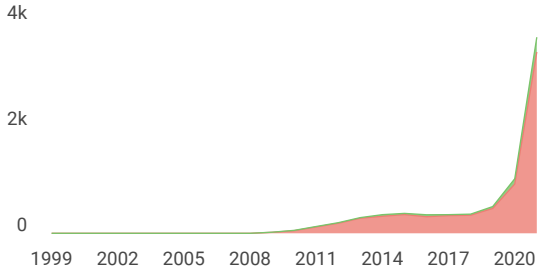

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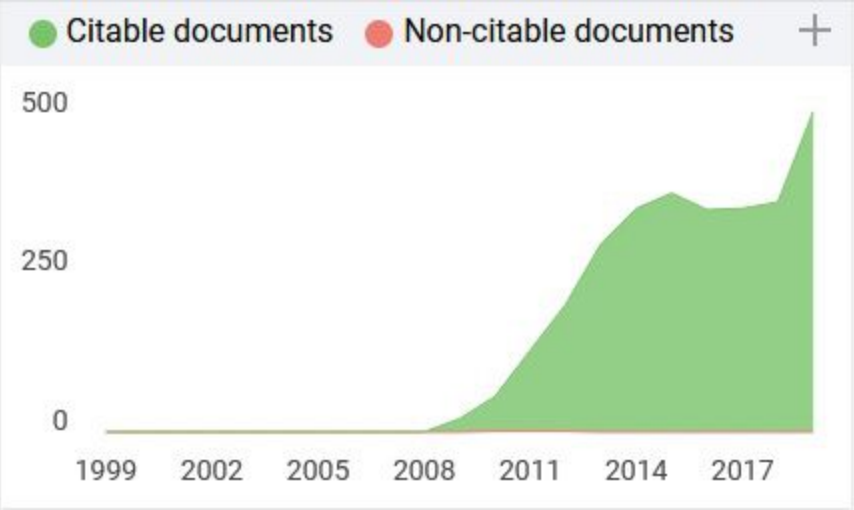

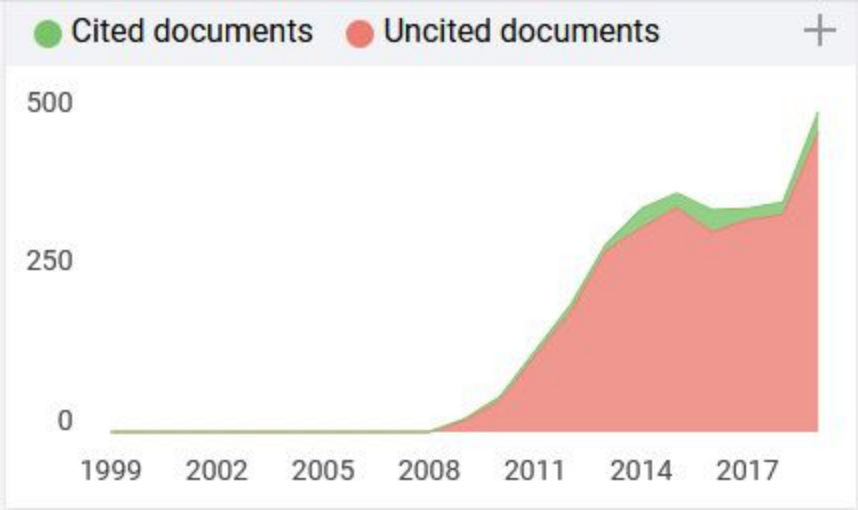

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ISSN-0973-9122 (Print) ● ISSN-0973-9130 (Electronic)

Volume 14 / Number 4 / October-December 2020

Indian Journal of Forensic Medicine & Toxicology

Website: www.ijfmt.com

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

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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 ± 0.0037 mg/g feces higher than the control group 0.0166 ± 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 ± 0.2458 mg/g feces higher than the control group 0.6045 ± 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 ± 0.2575 mg/g feces is higher than the control group 0.5879 ± 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*

Introduction

Preterm birth defined as every baby born before 37 weeks of pregnancy and is subcategorized in to 3 groups, 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.[1] Vernix caseosa, the sebaceous gland in infant for hydrating skin, maintaining pH, and containing antimicrobial protein and peptides (APP)[2], 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,*

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Haemophilus influenzae, Streptococcus pneumoniae, Grup B Streptococcus tipe III, Staphylococcus aureus, Clostridium difficile, Clostridium botulinum, Klebsiella pneumonia, Listeria monocytogenes, enterovirus, human immunodeficiency virus (HIV), Respiratory Syncytial Virus *(RSV),* Rubella, Norovirus, and porcine corona virus.[3] sIgA in breast milk are mainly produced by plasma cells in mammae 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.[4]

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.[5] 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-β, lactoferrin), barrier protection against oropharyngeal pathogens, oligosaccharide systemic and local effect, and protective effect against antioxidant.[5,6]

Two previous studies showed the safety and tolerability of oral care colostrum in preterm infant both with buccal swab[7] and syringe[8]. 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.[9] Another randomized study reported lower clinical sepsis incidence, increased proinflammatory and immune protective factors (including Urine IgA, lactoferrin, IL-1β, and saliva's TGF-β1 and IL-8).[10] 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 ± 0.0037 mg/g) was higher than control group (0.0166 ± 0.0139 mg/g), did not differ statistically ($p=0.595$). Meanwhile, the fecal secretory Ig A level after intervention (1.1007 ± 0.2458 mg/g) was higher than control group (0.6045 ± 0.2358 mg/g), did not differ statistically ($p=0.09$). Moreover, fecal secretory Ig A level difference in intervention group (1.0374 ± 0.2575 mg/g) was higher than control group (0.5879 ± 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 ± 0.0037 mg/g, 1.1007 ± 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 ± 0.0139 mg/g, 0.6045 ± 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.[11] Gestational age also has important role in the sIgA level. 29 weeks of gestational age has the highest sIgA level.[11] Very preterm infant (28-32 weeks) also has the higher sIgA level than late preterm (32-37 weeks) ($p<0.05$).[12] Furthermore, mother younger than 30 y.o. tend to have more sIgA level.[11] These show that sample characteristics play a role in secretory Ig A level ini 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.[11] 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.[13]

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

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
	Meconeal	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 : -

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