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# The risk of atopic dermatitis in post-term gestational age at Sanglah Hospital Denpasar: A preliminary study



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## ABSTRACTS

**Backgrounds:** Several studies reported that Atopic Dermatitis (AD) increases with gestational age. Prolong dominance of Th2 activity during gestation might contribute to the risk of atopic disease in infancy or beyond the period. This study aimed to evaluate the risk AD in post-term gestational age.

**Methods:** A prospective observational study was conducted among 73 living births at Sanglah Hospital Denpasar from December 2015 to January 2016 period. Infants were classified into 2 such as exposed (post-term) and non exposed (term and preterm) group. Parents-follow up by phone was carried out in 1 until 2 months interval. The study was finished once AD diagnosed, subject died or lost to follow up. Statistical analysis was carried out using SPSS ver. 20 software whereas P-value > 0.05 was considered significant.

**Results:** About 20 (233%) infants were preterm, 36 (49.3%) a term, and 17 (23.3%) post-term. The median value of follow up duration was 28 (14-35) days. Based on AD, there were total 24 cases which divided into 15(62.5%), 8(33.3%) and 1(4.17%) cases of AD in post-term, aterm, and preterm respectively. The incidence rate of AD in post-term was 88.2% while in non-post-term the incidence rate was 16.1%. The relative risk (RR) of AD in post-term was 5.47 (95% CI 2.94-10.23; P = 0.001)

**Conclusion:** Post-term is 5.47 times more likely to develop AD compared with aterm and preterm infant. In addition, the incidence rate of AD in post-term infant was 88.2% at Sanglah Hospital Denpasar

**Keywords:** Atopic dermatitis, gestational age, post-term, risk

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## INTRODUCTION

The clinical manifestations of atopic disease include asthma, food allergies, allergic rhinitis and atopic dermatitis (AD).<sup>1</sup> Atopic dermatitis, which is also known as atopic eczema, is known as a chronic skin disorder, relapsing, and highly pruritic dermatitis. AD is generally develops in infancy and early childhood whereas an age-dependent distribution has a particular characteristic which the onset is usually occur prior to 3 months.<sup>2,3</sup> AD has become a major public health problem despite of increasing prevalence, but also become challenge for the management. About one in three children with AD develops asthma or allergic rhinitis. Thus, AD has been regarded as the starting point for the 'allergic march,' which is the natural progression towards various atopic disorders in children.<sup>4</sup>

Atopic dermatitis often starts in early infancy, approximately responsible for 45% of all cases begin within the first 6 months of life, 60% during the first year, and 85% before 5 years of age.<sup>5</sup> The International Study of Asthma and Allergies in Childhood (ISAAC) suggests that the prevalence of atopic dermatitis varies between 0.3% and 20.5% worldwide.<sup>6</sup> The incidence of atopic dermatitis at Sanglah Hospital in 2012

was about 10.98% and increased by 45.7% in infants whose parents had a history of atopy.<sup>7</sup>

It is known that some related-events occurring in the earliest stages of development have a predispose to atopic diseases. Some studies reported that AD increases with gestational age.<sup>8</sup> Prolong dominance of Th2 activity during gestation might induce persistence of predominantly Th2 over Th1 after delivery. It has been suggested that during pregnancy, a mother's immune system is biased towards humoral Th2 type, rather than cell-mediated Th1 type immunity. The rationale would be to protect the fetus from Th1 cytokines, which are generally harmful to the maintenance of pregnancy. As the humoral Th2 type immunity is associated with atopy, prolong dominance of Th2 activity during gestation might induce persistence of predominantly Th2 over Th1 after delivery. This leads to the risk of atopic disease in infancy or beyond the period.<sup>8,9</sup> Many studies on AD development showed that boys more frequently develop AD than girls during infancy and there is shifting to girl predominance in adolescence.<sup>10</sup>

A paucity of data associated with the incidence of Atopic dermatitis in Indonesia has become a

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major concern. It is caused by specific management program will be conducted based on preliminary data. So that, our study aimed to determine the risk of AD in an infant born from post-term gestation at Sanglah Hospital Denpasar as a preliminary study.

## METHODS

### Sample criteria

A prospective observational study using consecutive sampling technique was conducted among 73 living births at Maternity Room Sanglah Hospital Denpasar, Bali from December 2015 – January 2016. The inclusion criteria used in this study were a vigorous baby, 2.5-4 kg of birth weight, the agreement of parents involved in this study, as well as having a number of contact person. In addition, the exclusion criteria used were infants without major congenital anomaly, long-term antibiotics administration, using a ventilator, and history of their mothers related to immunologic disorders, autoimmune disorders, or received long-term corticosteroid therapy.

### Atopic-dermatitis and Gestational age assessment

Williams criteria were used among subjects with suspected atopic dermatitis. If a diagnosis of atopic

dermatitis was confirmed, that subject was considered to have fulfilled the study outcome and then suggested for an appropriate referral-management in Sanglah Hospital. Also, data regarding mode of delivery were also collected which distinguished into vaginal delivery, vacuum extraction, forceps, and caesarian section

### Statistical Analysis

This study uses a self-questionnaires containing the identity of parents, allergy history data of parents and siblings, labor and delivery, an indication of labor, gestational age, birth weight, other risk factors that can trigger the emergence of atopic dermatitis as well as symptoms of atopic dermatitis. Subjects will be followed up each month during 3 months or until a diagnosis of atopic dermatitis was confirmed. Subjects who did not visit the Pediatric Outpatient Clinic were contacted by phone or short messages service (SMS/WA/LINE/telegram). The data will be analyzed using SPSS version 20.0 software descriptively and to determine the relative risk (RR). A P-value less than 0.05 was considered statistically significant.

## RESULTS

### Baseline characteristic of respondents

Based on gender, there were 42 (57.5%) and 31 (42.5%) of males and females born respectively. Most infants were more than 2500 grams after delivery. (75.4%). According to the mode of delivery, vaginal delivery was predominant (71.2%) compared with cesarean section (28.8%). Based on gestational age, there were 20 (23,3%) pre-term, 36 (49,3%) a term, and 17 (23,3%) post-term. The incidence of atopic dermatitis also increased with age such as 1 (4.17%) case in pre-term, 8 (33.33%) cases in a term, and 15 (62.5%) cases in post-term. The median duration of follow up was 28 (14-35) days. The characteristics of respondents are depicted in [Table 1](#).

The numbers of AD in post-term cases were 88.2% while in non-post term was 16.1%. In addition, the relative risk (RR) of AD in post-term was 5.47 (95% CI 2.94-10.23;  $P < 0.001$ ). ([Table 2](#).)

## DISCUSSION

Atopic dermatitis is a health problem in developing countries. The incidence of atopic dermatitis in various countries has been observed to increase significantly in the last 3 decades. Atopic dermatitis is a serious health problem that has short-term and long-term consequences.<sup>11</sup>

Identification of at-risk groups, improved understanding of the pathogenesis, management and modalities of AD therapy as well as their

**Table 1** Baseline characteristics of respondents

Variable	N (%)	Median (min-max)
<b>Sex</b>		
Males	42 ( 57.5%)	
Females	31( 42.5%)	
<b>Birth weight</b>		
< 2500 grams	18 (24.6%)	
≥ 2500 grams	55 (75.4%)	
<b>Mode of delivery</b>		
Vaginal	52 (71.2%)	
Cesarean section	21 (28.8%)	
<b>Atopic history</b>		
Yes	22 ( 30.1%)	
No	51 ( 69.9%)	
<b>Gestational age</b>		
Pre-term	20 (23.3%)	
Aterm	36 (49.3%)	
Post-term	17 (23.3%)	
<b>Atopic dermatitis</b>		
Pre-term	1 (4.17%)	
Aterm	8 (33.33%)	
Post-term	15 (62.5%)	
<b>Follow up duration (Days)</b>		28 (14-35)

**Table 2** The relative risk of AD in post-term and Non-Post term gestational age

Gestational age	Atopic dermatitis		RR	95% CI	P
	Yes (n,%)	No (n,%)			
Postterm	15 (88.2)	2 (11.8)	5.4	2.94-10.23	0.001
Non-Post-term	9 (16.1)	47 (83.9)	0.14	0.03-0.51	

RR: relative risk; CI: confidence interval; P: statistically significant if < 0.05

mechanisms of action led to the development of efforts to prevent the occurrence of the disease.

Through the atopic hypothesis of dermatitis associated with gestational age, research was conducted that attempted to determine the incidence and risk of AD as a preventive DA modality.<sup>8,12</sup>

Although the underlying mechanism is not fully known, Prolong dominance of Th2 activity during gestation may induce persistence of predominantly Th2 over Th1 after delivery. This leads to the risk of atopic disease in infancy or beyond the period.

From our primary data, we found that the incidence of AD was increased with gestational age. These results are in accordance with a study conducted by Pekkanen et al whereas the incidence rate of AD increases linearly with the duration of pregnancy.<sup>8</sup> Post-term infants have a significant increase to the symptoms of AD as well as the progress of growth and development later. In vice versa, children who born fewer months (Pre-term) showed a significant decrease in risk of DA.<sup>13,14</sup>

In our study, the median duration of the diagnosed AD was 28 (14-35) days. This is consistent with the study Conducted by Wahn et al. whereas the AD was the earliest manifestation of atopy disease with the highest incidence in the first 3 months until first 3 years of life about 44%.<sup>14</sup> The Copenhagen Prospective Study on Asthma in Childhood (COPSAC) conducted by Halkjaer et al. also reported that AD first encountered at 1 month of age, then increased and peaked at 2.5 years of age.<sup>15,16</sup>

In our study, the incidence rate of AD in post-term was 88.2% while in non-post-term the incidence rate was 16.1%. The relative risk (RR) value of AD in post-term was 5.47 where this result indicates that increase gestational age was more likely to develop AD 5 times compared with pre-term or a term.

## CONCLUSION

The incidence rate of AD in a post-term infant at Sanglah Hospital was predominant. The post-term condition would be contributed 5.47 times toward AD compared with a term and pre-term infant. Further study with a longer duration of the time as well as involved bigger sample size are necessary to determine the causal relationship between AD and gestational age which can be generalized into the population.

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