The comparison of deciduous teeth eruption pattern in small gestational age (SGA) and appropriate gestational age (AGA) children

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ABSTRACT

SGA is defined as infant whose birth's weight was below the tenth percentile intrauterine growth and development curve of Lubchenco. There are two types of SGA children, namely symmetrycal SGA (the disturbance occurred in the first trimester of pregnancy) and asymmetrical SGA (the disturbance occured in second and third trimesters of pregnancy). The aim of this research was to obtain the deciduous teeth eruption patterns in symmetrical and asymmetrical of Small for Gestational Age (SGA) children, based on baby teeth that have erupted the eruption of primary teeth. The research design was descriptive and analytical, with cross-sectional design and using the given sample size. The sample were 28 SGA children aged 1-4 years and 33 Appropriate Gestational Age (AGA) children as control. Determination of SGA children based on Ponderal Index. Eruptive stage was determined by Nola Modification Scoring by the score between 0-4. Score (0) for tooth that have not erupted; (1) tooth emerge; (2) crown erupted tooth; (3) ½ crown erupted tooth; and (4) full crown tooth. The results showed, that there were differences in the pattern of deciduous teeth eruption based on teeth eruption stages that have been erupted. Deciduous teeth eruption pattern of SGA children were slower than the AGA children. Different patterns of deciduous teeth eruption in symmetrical SGA children and asymmetrical SGA children were showed. Viewed from the standpoint of view the stage of teeth eruption, the deciduous teeth eruption pattern of symmetrical SGA children was slower than the asymmetrical SGA children.

Key words*:* Stages of tooth eruption, small for gestational age

INTRODUCTION

Teeth growth and development are closely related with general child growth.[1] This is influenced by intrinsic and extrinsic factors such as nutrition intake.[2] Nutritional state mainly correlated with the growth and development since embryo. Expectant women with adequate nutritional intake, will deliver a baby with normal weight, while the less adequate nutritional intake mothers, will deliver a baby with low birth weight (LBW).[3]

Normal babies also called as baby born with appropriate gestational age or AGA. If it was less time in gestational, then it is called small gestational age (SGA). SGA means babies with birth weight at or below the tenth percentile of intrauterine growth and development curve or below -2 SD based on the Lubchenco gestational age curve, can be delivered in less time (premature, is a baby delivered at 37 weeks of gestational age) and appropriate time (mature) or even more.[4]

Based on Klauss and Fanaroff[3] there were two types of SGA which were symmetrical SGA

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and asymmetrical SGA. The symmetrical SGA is an SGA with disruption in the first trimester of gestation, while the asymmetrical SGA is an SGA with disruption in the second and third trimester of gestation.[4]

SGA was caused by retarded of intra uterine growth as a result from factors such as mother, embryo, or placenta. The mother factor is such as chronic disease, malnutrition and heavy infection, alcohol addiction, hypertension, heavy workload, and smokers. Besides every mother aged less than 16 years old, or more than 35 years old and less height than 145 cm were also included in mother factor. The embryo factor is hereditary, genetic, and chromosome disorders; while the placenta factor including placental infarction, tumor, and placentitis.[4] SGA babies resulted from placental insuficiencies will accelerate its growth into normal condition after birth and would be catch up to normal growth and hereditary if it lives in an optimal environment.[5] The development, depends on the cause of the disturbance, nutritional condition, and social environment. Recent study said that most of the premature babies would show a fast growth in the first 3 years. The term *catch up* means a baby or a child which growth rate fast and would be similar with AGA children.[6] Based on Morrissette, *catch up* is a fast growth in babies or children born with Small Gestational Age or those who had health problems severe enough to catch the normal growth pattern for a certain period of time. *Catch up* often occurred before two years of age.[6]

Deciduous teeth germs had been formed inside the jaw since the embryo aged four to six weeks of gestation. The deciduous teeth crown formation completed at 4th month *in utero*, erupted for the first time at 7 month. The deciduous root completed at 1½-2 years of age. At the time it was erupted, only the crown formation had been completed while the root formation would be continuing its formation until approximately two years after that.[7] Tooth eruption is a continuous process and was started at the beginning of tooth formation until it erupted to the oral cavity.[1] Table 1 showed the deciduous teeth eruption based on the month age and the mean according to Moyers.[8]

The study of Sjarif and Oewen[7], showed that the SGA children had their teeth erupted late.[9] Based on Syarief,[10] asymmetrical SGA children had a better teeth development prediction than the symmetrical SGA children. This showed that the SGA children underwent inhibition of dental development at prenatal.[9] According to a study by Maroney, it showed that children with premature disorders and LBW had a higher risk of oral disorders such as delayed eruption of the teeth.

Table 1. Deciduous teeth eruption table based on the quantity in normal children[8]

Moon	Average tooth	Total tooth
6	-	1 tooth or more
9	3	1 – 6
12	6	4 – 8
18	12	9 – 16
24	16	15 – 18
30	19	all decidous teeth

Severe nutritional deficiencies at the gestational age will result in dental disorder such as delayed teeth eruption which also had a deleterious effect to the dental completeness and the high caries prevalence so that would cause a decrease in the children general health, thus the dental eruption could be reflection of the children dental health.[1] Therefore the deciduous teeth eruption pattern in dentistry is an important factor in treatment planning or determining prognosis, and can help one to detect impaired child growth and development generally.[9]

Studies regarding the timing of deciduous teeth eruption in SGA children had been widely studied, but not about the deciduous teeth eruption pattern for children with SGA compared to AGA based on the erupted deciduous teeth phases and based on the SGA types seen from erupted teeth pattern had not yet been done. This had encouraged us to do the study regarding those point of interests.

MATERIAL AND METHODS

Examination including the children age, height and weight, which met the dental examination criteria; deciduous teeth eruption pattern in this study assessed by erupted deciduous teeth phase. It was scored: (0) for non erupted teeth, (1) for emerged teeth, (2) for 1/3 of the crown erupted,

3 for ½ of the crown erupted; and (4) for the fully crown erupted. The AGA, and SGA criteria were seen from their mother's status while giving birth. On the mother status it would be seen whether the baby was AGA, SGA, adequate age of month, or premature. Data collected in the form of phase score and amount of the total teeth at the certain age, weight and height at birth, weight and height at the time of study. All of the data were noted in the dummy table. It contained data regarding the number, name, gender, age, types of SGA, birth weight and height, present weight and height and erupted teeth, health control card, then the comparison of the SGA children and the AGA (normal) children was done. Data analyzed using the statistics approach in form of tables and graphs.

RESULT

Subsequently, it would be assessed the symmetrical and asymmetrical SGA based on the erupted deciduous teeth phases. Result of this study toward the deciduous teeth eruption pattern of symmetrical and asymmetrical SGA, and AGA at the age of 1-4 years old could be seen on Table 2.

Descriptively, it was seen that the symmetrical SGA at the age of 1 year old had no teeth at all while the asymmetrical SGA had 2 teeth already, at phase 2. At the age of 2 years old, there was 4 teeth at phase 4. The asymmetrical SGA children had already 4 teeth at phase 3, and 36 teeth at phase 4. While the AGA had 2 teeth at phase 1 and 110 teeth at phase 4. So there was a late eruption pattern based on the eruption phases as showed at the age of 1 and 2 years old, particularly in symmetrical SGA, at the age 2 years old we could finally seen deciduous teeth erupted.

It was seen at the age of 3 years old in symmetrical SGA children, still showed eruption at every phase of eruption (phase 1 to 4), while in asymmetrical SGA children only at phase 3 and 4 of eruption. But from the mean of total erupted

Table 2. Deciduous teeth eruption in SGA and AGA children based on the eruption phase and aged at 1-4 years old.

Age	Eruption	Symmetrical	Asymmetrical	SMK	p-value	Total
	1	0	0	3		3
1st	2	0	2	1		3
Years	3	0	0	1	0.1183	1
	4	0	0	5		15
	Total	0	2	10		22
		n=2	n=1	n=2		
	1	0	0	2		2
2nd	2	0	0	0		0
Years	3	0	4	0	0.0038	4
	4	4	36	110		150
	Total	4	40	112		156
		n=1	n=2	n=6		
	1	1	0	0		1
3rd	2	4	0	0		4
Years	3	4	5	0	0.0038	9
	4	51	135	240		426
	Total	60	140	240		440
		n=3	n=7	n=12		
	1	0	0	0		0
4th	2	1	0	0		1
Years	3	4	3	0	0.0038	7
	4	113	115	260		488
	Total	118	118	260		496
		n=6	n=6	n=13		

Note:P<0.001=* very significant

teeth, at the age of 3 and 4 years old each of the types of SGA children had 20 teeth. So at the age of 3 and 4 years old the total erupted teeth had completed for the AGA children, while the symmetrical and asymmetrical SGA children had not fully reached their phase of eruption, thus can be concluded that there was delayed eruption of deciduous teeth as seen on the phases and number of erupted teeth at 1 and 2 years old in SGA children compared to the AGA children. Then at the age of 3 and 4 years old the SGA children had the delayed eruption while the number of teeth had completed.

At the age of 1 year old in the symmetrical SGA children had no teeth erupted while at the asymmetrical had already erupted teeth. In the asymmetrical SGA it was seen that at phase 2 there were 2 teeth erupted, while at the age of 4 only 10 teeth erupted. There were no teeth in the phase 1 and phase 3 of asymmetrical SGA. In the AGA children it had erupted teeth at every phase, the most was at the phase 4 which was 5 teeth. This showed that the symmetrical SGA had delayed eruption of deciduous teeth compared to asymmetrical SGA. This means there was a delayed eruption in symmetrical SGA, then the asymmetrical SGA and the AGA children were the fastest.

The symmetrical SGA at the age of 1 and 2 years old had a delayed eruption compared to the asymmetrical SGA, while at the age of 3 and 4 either the symmetrical SGA or the asymmetrical SGA had completed amount of teeth but based on their phase of eruption the symmetrical SGA children were slower than the asymmetrical SGA children.

DISCUSSION

Deciduous teeth eruption pattern based on the dental eruption phase in SGA and AGA children could be seen in Table 2, descriptively there were differences in eruption pattern based on the eruption phase in SGA and AGA children, overally at the age from 1 to 4 years old. The Kruskal-Wallis statistics analysis showed that there were differences in the deciduous teeth eruption pattern based on the eruption phase between the SGA and AGA children were very significant. This means that there was delayed eruption of deciduous teeth in SGA children compared to AGA children.

This condition was because of, SGA children had inhibited intra uterine growth that caused the intra uterine malnutrition, therefore nutritional supply to the embryo decreased.[4] The lack of nutritional supply in prenatal had caused disorders in several organs including the teeth because of deciduous teeth growth and development period were occurred in prenatal. As seen from the deciduous teeth eruption pattern based on the difference of eruption pattern in AGA children, and symmetrical and asymmetrical SGA children, it showed that, at the age of 1 year old in SGA there were no erupted teeth, while at the asymmetrical SGA and AGA had their deciduous teeth erupted. This showed that the symmetrical SGA children had delayed eruption compared to asymmetrical SGA and AGA. The 2 years old group was also like this, in the symmetrical group at the age of 2 years old the number of erupted teeth almost normal, but the phase was different from the AGA, even though it had the same amount of teeth. At the symmetrical SGA children had less teeth erupted, then the asymmetrical SGA and the most teeth erupted were in AGA children. This correspond with the study of Williyanti[9] that asymmetrical SGA children had the better prediction of dental development than the symmetrical SGA children.

This means in reaching their *catch up growth,* the asymmetrical SGA children were better than the symmetrical SGA children. This also showed the rapid growth in Small Gestational Age babies or those who suffered from severe health disorder to catch up the normal growth in certain period of time, in asymmetrical SGA it is better than the symmetrical SGA.[3] This is because of the symmetrical group had the disturbance earlier than the asymmetrical group, so that the growth and development of the symmetrical group were slower than the asymmetrical group. This is correspond with the study by Willyanti that, the linier defect of deciduous teeth in symmetrical is worst than the asymmetrical.[10]

The symmetrical and asymmetrical SGA, and AGA at the age of 3 and 4 years old based on the erupted teeth have no difference because all the teeth have been erupted with mean of 20 erupted teeth but there are differences in the phases at the age of 4 years old that the symmetrical SGA

has a later period, then the asymmetrical SGA and the earliest is the AGA (Tab. 2).

The difference of eruption pattern of symmetrical SGA and asymmetrical SGA statistically not significant, even though from the amount of erupted teeth between symmetrical and asymmetrical SGA clearly different, in the asymmetrical SGA there were more erupted teeth than the symmetrical SGA. This is because of the small sample size, and uneven in every group.

If compared to Moyers table in Table 1. (deciduous teeth eruption table based on the quantity in normal children[9]) can be concluded that the result of 1 year old symmetrical SGA children have no erupted teeth while based on the Table 1. it has to be 4 to 8 teeth erupted already.

At the age of 2 group in symmetrical SGA there were 4 teeth, asymmetrical SGA had already 20 teeth erupted in every sample and also with the AGA. Based on Table 1 at the age of 2 years old at least 15 to 18 teeth were erupted.

According to Table 1 at the age of 30 months or approximately 2 years and 6 month the deciduous teeth had completely erupted. The result had shown that children at the age of 3 and 4 years old had their teeth erupted completely which were 20 teeth.

That strengthen the statement about asymmetrical SGA had the better dental development prediction than the symmetrical SGA children.[8] This can be seen in children at the age 1 and 2 years old either symmetrical or asymmetrical SGA had less erupted teeth than the AGA children. At the age of 3 and 4 years old the erupted deciduous teeth in symmetrical SGA or asymmetrical SGA catched up the AGA children, this is because of the *catch up growth*.

CONCLUSION

There is difference in deciduous teeth eruption pattern based on the eruption phase in symmetrical SGA and asymmetrical SGA, the symmetrical SGA children were later than the asymmetrical SGA children.

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