

The Effect of stunting on number of primary teeth eruption among 19-60 months old stunted toddlers in Panduman Village, Jelbuk, East Java



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Abstract

Objective: The aim of this study was to determine the effect of growth stunting on the number of primary teeth eruption from a representative Panduman Village, Jelbuk, East Java.

Material and Methods: This is an analytic observational with a cross sectional approach study. Parents of the stunted toddlers were invited and 25 toddlers (age between 19-60 months) were participated in the study. There were 25 normal growth toddlers who had the same age range who were also invited in this study as for the normal control group. In this study, the tooth were considered to have erupted if the crown if the tooth was clinically visible through the gingival mucosa. Data was than divided into 4 (20-30, 31-40, 41-50 and 51-60) age categories, The average data for each category was analyzed with

independent T test if necessary.

Results: All primary incisors have been erupted for all age category for both stunted and normal control population. The number of primary canines were significantly difference ($P > 0.02$) only in the 20-30 months age category. It may suggest that stunting affect the eruption time of primary canines. However, the number of erupted primary molars were not significantly difference in all age categories between stunted and normal controls groups.

Conclusion: Stunting potentially affect the eruption time of primary teeth. Further study involving larger number of sampel is required to conform this findings.

Keywords: Stunting, Eruption, Primary teeth

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Introduction

Stunting represents poor linear growth as a function of age. Over the past decade, the prevalence of stunting remains high and continues to be a serious problem in Indonesia. Indeed, The National Basic Health Research (KEMENKES) 2020 reported that the incidence of stunting in East java reaches 12.2%.¹ Jelbuk village was one of the founding villages in 2020 that program about stunting reduction.² The most direct cause of stunting is lack in growth promoting nutrients and recurrent infection of diseases which cause poor nutrient intake, absorption or utilization of the foods. Impaired growth in children mostly due to prolong nutritional deficiency.^{3,4}

Tooth eruption in the oral cavity is defined as a physiological movement of tooth from it sites of position development toward the occlusal plane after passing through the alveolar bone and the mucosa covering the jaw.⁵ The eruption time of incisors, canines and molar is in a sequence particular time. Although all the factors associated with tooth eruption are not yet known, however chronic inadequate nutrition intake are thought to be the most important factor that may cause disturbances in bone maturity time which will further interfere with timing and sequence of tooth eruption.^{4,6}

In the past decade, studies involving various associations between nutritional deficiency, oral and dental health have been reported. Some studies had reported that there is a correlation between oral and dental health with nutritional intake.^{7,8} Chronic malnutrition during childhood have been reported to delay the growth of the primary teeth.^{6,9,10} However, within a normal grow children, percentage body fat play has been shown a significance role in the permanent first molar eruption time.⁶ Although some study shown high correlation between nutrition and tooth eruption,^{10,11} controversy exist regarding that some researchs shown the calcification time and tooth eruption were not related with nutrition intake.^{7,12} Other studies shown poor correlation.¹³⁻¹⁵ Studies associated with nutrition intake and tooth eruption however, most were conducted for the permanent teeth only.

However, study on the effect of stunting on the number of primary tooth eruption was limited. Prasetyowati¹⁴ reported the effect of stunting on lateral primary teeth only. This study is aimed to determine the effect of stunting not only on primary incisors but also primary canines as well as the primary.

Material and Methods

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This analytic observational study with a cross sectional approach was conducted in September until December 2020 in Panduman Village, Jelbuk, East Java. Total of 50 toddlers (25 stunted and 25 normal control) age between 20-60 months were participated in the study. Stunted toddlers were defined as height-for-age is more than two standard deviations below (-2 SD) the WHO Childs Growth Standard median. Other criterion was that parents have to agreed and willing to fill out the informed consent.

With the health protocol regulation during the COVID_19 pandemic, an intra-oral examanation to calculate the number of erupted primary tooth was carried out using intra-oral photos and intra-oral videos. The results of the photos and videos were than analyzed at the Jember University Dental Hospital to determine the number of erupted primary tooth in aech toddlers. In this study, the tooth were considered to have been erupted if the crown of the tooth was clinically visible the gingival mucosa.

In order to precisely study the effect of stunting on incisors, canines and molars, the age group was divided into 4 categories (20-30, 31-40, 41-50, and 51-60 months). The average number of erupted teeth for each category was analyzed with independent T test if necessary. this study deliberately ignore the gender factor, because gender does not effect the eruption of the primary teeth in some research.^{16,17} The study received ethical approval from the Health Research Ethics Committee of the Faculty of Dentistry, University of Jember, Indonesia. Parents of participating toddlers provided written informed consent.

Results

This study found that all primary incisors have been erupted in all age categories for both stunted and

normal control toddlers as shown in Table 1. This finding can not show the effect of stunting to the eruption time of primary incisors. This may be due to the fact that the age categories is indeed high above the normal time for the incisor to erupt.

However, for the canines, the average number of erupted primary canines in stunted and normal control toddlers aged 20-30 months and was significantly difference ($P > 0.02$). While for the 31-40, 41-50, and 51-60 age categories, all primary canines were not significance as primary canines all have been erupted for both populations Table 2.

Figure 1 shows the distribution and average number of erupted primary canines. In 20-30 months category, it shows the distribution of erupted teeth in which only 5 (55.55%) stunted toddlers shown to have all canines erupted in comparition to that of 9 (100%) normal control toddlers. In addition, there were 3 (33.33%) stunted toddler have only 2 erupted canines and 1 (11.11%) stunted toddler have only 3 erupted canines. However for 31-40, 41-50, and 51-60 age categories, both populations shown to have all of their primary canines been erupted.

Table 3 shows that stunted toddlers had less average number of erupted primary molars than that of normal controls in 20-30 and 31-40 age categories, however, these difference doe not reach significant level. In 41-50 and 51-60 months age categories, it shows that both populations had all of their primary molars erupted.

Figure 2 shows that in the 20-30 months category, there is only 1 (11.11%) stunted toddlers shown to have all their primary molars erupted and are 3(33.33%) normal control toddlers whose all molars have erupted. In this age category majority

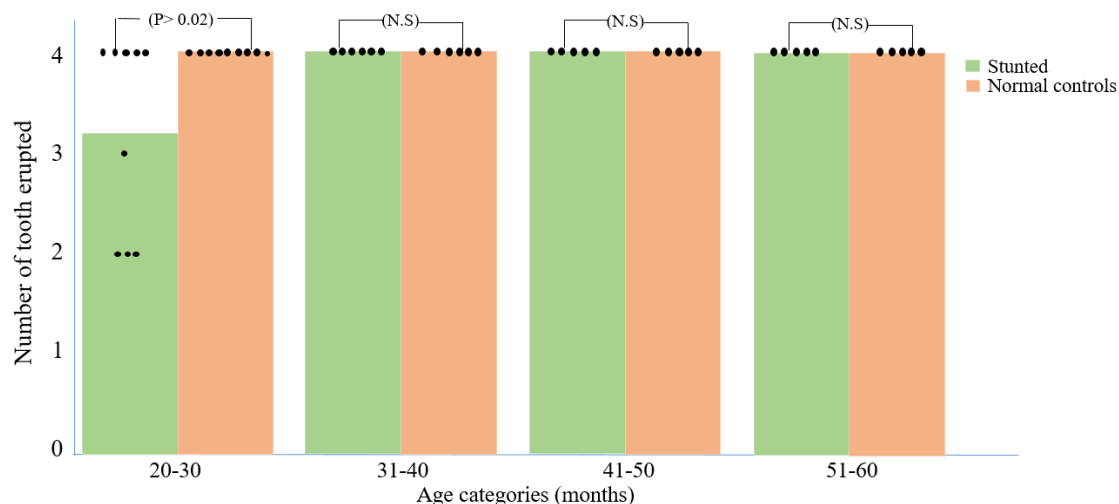


Figure 1. Distribution and number of erupted primary canines

Table 1. Average number of erupted primary incisors in difference age categories

Age Categories (Months)	Stunted		Normal Controls		p**
	N*	Mean ± SD	N	Mean ± SD	
20-30	9	8.00 ± 0.00	9	8.00 ± 0.00	N.S
31-40	6	8.00 ± 0.00	6	8.00 ± 0.00	N.S
41-50	5	8.00 ± 0.00	5	8.00 ± 0.00	N.S
51-60	5	8.00 ± 0.00	5	8.00 ± 0.00	N.S

* Number of toddlers

** Value of independent t test

Table 2. Average number of erupted primary canines in difference age categories

Age Categories (Months)	Stunted		Normal Controls		p**
	N*	Mean ± SD	N	Mean ± SD	
20-30	9	3.22 ± 0.98	9	4.00 ± 0.00	0.02
31-40	6	4.00 ± 0.00	6	4.00 ± 0.00	N.S
41-50	5	4.00 ± 0.00	5	4.00 ± 0.00	N.S
51-60	5	4.00 ± 0.00	5	4.00 ± 0.00	N.S

* Number of toddlers

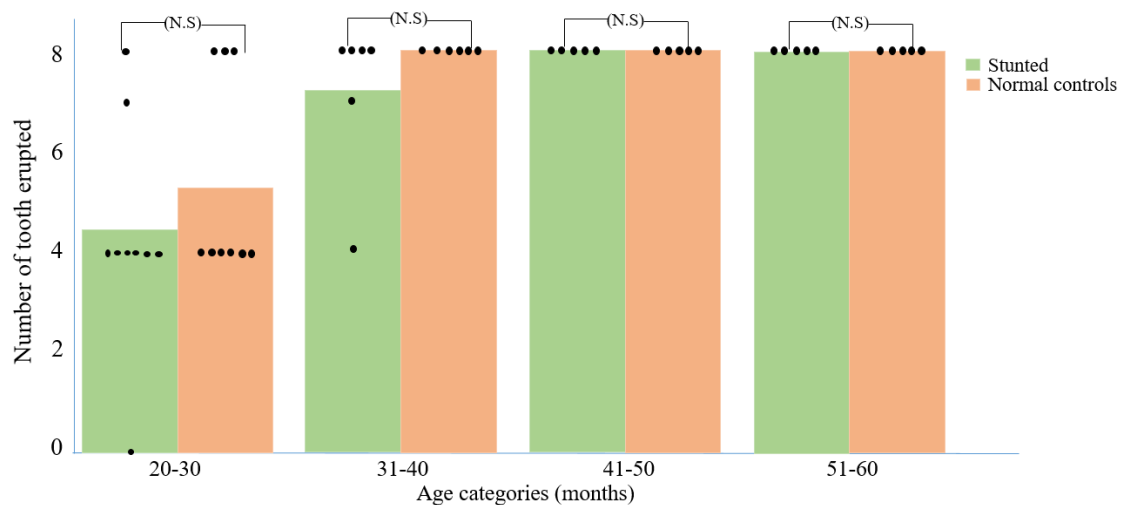
** Value of independent t test

Table 3. Average number of erupted primary molars in difference age categories

Age categories (Months)	Stunted		Normal Controls		P
	N	Mean ± SD	N	Mean ± SD	
20-30	9	4.33 ± 2.24	9	5.33 ± 2.00	N.S
31-40	6	7.17 ± 1.60	6	8.00 ± 0.00	N.S
41-50	5	8.00 ± 0.00	5	8.00 ± 0.00	N.S
51-60	5	8.00 ± 0.00	5	8.00 ± 0.00	N.S

N: Number of toddlers

P: Value of independent t test

**Figure 2. Distribution and average number of erupted primary molars**

of both populations have only 4 erupted primary molars. Due to the limitation number of sample, this study was not separate upper and lower molar to take into account.

Further more, in 31-40 age category, there is only 4 (60%) of stunted toddler shows to have all primary molars erupted compare to that of 6 (100%) for the

normal control toddlers. However, the difference of mean was not significant for all age categories. While in 41-50, 51-60 month age categories, all stunted and normal control toddlers have all their primary molars erupted.

Discussion

Similar studies tried to determine the effect of stunting on tooth eruption time have been reported, however, most studies were mainly reported the effect of stunting on permanent teeth particularly in molars.^{18,19} This study concern with the effect of stunted on all primary teeth eruption time.

This study expected that there was a delay on eruption time of primary incisors. However, this study was not able show the effect of stunting on primary incisors eruption time, as all primary incisor teeth had been erupted in all age categories in both populations. This may be due to the fact that age range categories in this study were far above the average eruption rate of the primary incisors. As normally average for primary central incisors is erupted at 6-7.5 months while the maxillary primary lateral incisor is erupted at 7-9 months year of age.²⁰ This may suggest that study on primary incisor should be conducted at younger age range.

We found a significance delay in primary canine eruption time only in the 20–30-month age range and found not significance difference in primary canine's eruption time in older age categories. This mean that in stunted toddlers delay in primary canines' eruption is approximately between 2 to 12 months above the normal range of eruption time. This can explain why there is no significant difference higher age categories.

Inadequate nutrition that consequently factor of impairing skeletal growth might alter the time of primary tooth eruption to be delayed.⁷ Psoter¹⁰ reported the chronic malnutrition in early childhood was correlate with delayed teeth eruption due to “metabolic shift” that affect the growth and development of bone structure. Other study also reported that inadequate nutrition intake can lead a delay in tooth eruption time due to impaired bone maturation.⁴

However other study reported that in normal growth children, but less amounts of body fat also showed delay tooth eruption time.⁸ This means that it is not only chronic nutritional deficiencies that cause delays, but also changes in body composition that can cause delayed tooth eruption in children. The results of this study suspect that the delay in tooth eruption in stunted children occurs through changes in body composition. Body composition status have been proven to affect tooth eruption time.^{6,8} Prijatmoko et al.⁶ reported accelerated tooth eruption seen in children with a high percentage of body fat due to changes bone maturation time. Another study also report that early tooth eruption may occur at toddlers with higher percentage of body fat.^{6,21}

Similar founding was shown in primary molars. However, this study failed to determine the delayed eruption of molars in stunted group, as the results showed that the stunted toddlers not significant difference with normal control toddlers. This perhaps due to small number of populations studied and age range of this study which was too high above normal primary first and second molar (12-24 Months) eruption time.²⁰

Conclusion

Based on the results of this study, stunting toddlers showed to have delayed eruption of primary canine's eruption time but not for primary incisors and molars. Other study involving the determination of body composition among stunted children is required to seek changes in body composition among stunted children

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Conflict of Interest

The authors report no conflict of interest.

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