

The Impact of Prenatal Nutritional Status on Occlusion of Primary Teeth among Kindergarten Children in Al- Kut City/ Wassit

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Abstract

Background: When malnutrition begins early in life it affects adversely various aspects of growth including dental arch and increase the severity of oral problems in later life. The aim of present study was to assess the effect of prenatal malnutrition on the occlusion of primary teeth

Material and method: This survey was conducted among urban kindergarten children in Al- Kut city of Wasit governorate. The sample 959 children aged 4 and 5 years were randomly selected from different areas of Al-kut city. The assessment of nutritional status was performed using prenatal anthropometric measurements, and primary dentition terminus was used for assessing dental arch relation.

Result: According to prenatal anthropometric indices preterm children constitute 23.46%, whereas low birth weight children constitute 13.66%. Flush terminus plane was the more prevalent type of occlusion for the total sample 47.86% while among preterm and low birth weighted children the mesial step terminus was more prevalent type of occlusion.

Conclusion: The prenatal malnutrition had some effect on the arch relation among kindergarten children

Keywords: Wassit; primary teeth; prenatal Nutritional Status

Introduction

Nutritional status is a state that is resulting from the balance between the nutrients intake and the nutrients expenditure 1. Nutritional anthropometry remains the most practical and useful means for assessment of the nutritional status of population, particularly among infants and young children. Nutritional anthropometry is able to detect an imbalance of energy and nutrients in relation to need. Anthropometric indices are indices of post natal malnutrition 2 and prenatal malnutrition which include gestational age and birth weight 3 .

Gestational age defined as the number of weeks from the first day of the last normal menstrual period to the date of delivery. It is one of the varieties of anthropometric indices of prenatal malnutrition 4. Full term infants are those that born between 37 to 42 weeks of gestation, post term infants are those born after 42 weeks of gestation and preterm infants are those of

less than 37 weeks gestation 5. Birth weight is another anthropometric index of prenatal malnutrition 3 . WHO (1972) and Mayes et al (1997) define any infant weighing less than 2500 gram at birth should be called low birth weight child, this definition is useful to identify a group of new born at high risk of postnatal health complication and death 6 . Weight at birth is a good indicator not only for the mother's health and nutritional status, but also the newborn's chances for survival, growth, long term health and psychosocial development; low birth weight increased risk of dying during their early months and years 7 .

The science of occlusion is described by Foster (1982) that the occlusion of the teeth is any position in which the upper and lower teeth come together and the articulation of teeth is the functional movement of the lower dentition in contact with upper dentition 8. The term normal occlusion encompasses minor deviations from the ideal, which do not constitute the esthetic

or functional problems. It is not possible to specify precisely the limits of normal occlusion and so there can be disagreement even between experienced clinicians about categorization of border line cases 9. On the other hand Jones et al (2000) defined the normal occlusion as that occlusion which classifies the requirements of function and esthetic but in which there are minor irregularities of individual teeth 10. Malocclusion is defined by Jones et al (2000) as an occlusion in which there is a mal relation between the arches in any of the planes of space or in which there are anomalies in tooth position beyond the limit of normal. Malocclusion refers to any degree of irregular contact of the teeth of the upper jaw with the teeth of the lower jaw. This would include overbites, under bites and crossbites. There is no specific system of deciding how much misalignment is too much 11. WHO (1997) including malocclusion under the heading of handicapping dentofacial anomaly, because it can cause problems with the child's bite, gum tissue, speech development and appearance 12, 13. As far there is no previous Iraqi study concerning the effect of prenatal nutritional status on the dental arch relation this study was conducted in order to assess the effect of gestational age and birth weight on the occlusion of primary teeth

Materials and Method

After taking permission from Ministry of education, eight kindergartens had been selected randomly from 23 governmental one in AL-Kut city. A cluster sampling is done by carrying out a complete enumeration of each of selected kindergarten. Any children with systemic disease and uncooperative children were excluded. The age of the child in this study was calculated according to the criteria mentioned by World Health Organization (1987) that was according to the last birthday 14.

Prenatal nutritional status was assessed by using anthropometric measurements including Birth weight according to the criteria of Roberton in 1993 that include When child's birth weight is ≥ 2500 gm is consider as normal birth weight while when child's birth weight is < 2500 gm is consider as low birth weight 15; other anthropometric measurement include gestational age that assessed according to Steer(1995) that include description of full term infants are those born between 37-42 weeks of gestation, while post term infants are those born after 42 weeks of gestation however the preterm infants are those of less than 37 weeks gestation 5.

Concerning occlusion of primary teeth ,primary terminal plane was used in this study 16 ; this terminal plane can be classified into one of the three categories:

1) Flush terminal plane (flush terminus): means that the anterior- posterior positions of the distal surfaces of opposing primary second molars are in same vertical plane.

2) Mesial step terminus: is defined as a lower second primary molar terminal plane that is mesial to the maxillary primary terminus.

3) Distal step terminus: is descriptive to the situation in which the mandibular second primary molar terminus is distal to the upper second primary molar terminus.

Statistical analysis: data description, analysis presentation were performed by using Statistical package for social sciences (SPSS). Descriptive analysis: frequency, percentage used for nominal variables. Level of significance: not significant at $P>0.05$, significant at $P\leq 0.05$, and highly significant at $P\leq 0.01$

Result

In the present study the total sample involved was 959, whereby 398 children aged 4 years (41.50%) and 561 (58.50%) children aged 5 years. The distribution of the sample according to gender illustrates that the male constitute 49.74% while female constitute 50.26% of the total sample. However in the present study the prevalence of preterm children was 23.46 % while the prevalence of low birth weight in the present study was 13.66%

The distribution of children according to relationship of primary terminal plane by age and gender is shown in Table 1. Data analysis of primary terminal status in this study showed that for the total sample the percentage of children with flush terminus (47.86%) was higher than percentage of mesial step terminus (46.72%) and distal step terminus (5.42%). This figure is true among children aged 5 years as well as among total male. While the opposite picture was found among total female as well as 4 year old children that the highest percentage was mesial step terminus and the lowest percentage was distal step terminus.

Table 2 demonstrates the distribution of children according to relationship of primary terminal plane by gestational age and birth weight. Data analysis shows that among full term children teeth with flush terminus

was the more prevalent, while among preterm the prevalent type was mesial step terminus. Concerning birth weight; children with normal birth weight had the higher percentage of flush terminus, on the other hand teeth with mesial step terminus was the more prevalent among low birth weight children.

Table 1 The distribution of children according to relationship of primary terminal plane by age and gender .

Age (year)	Gender	Primary terminal plane					
		Mesial step		Distal step		Flush terminus	
		No.	%	No.	%	No.	%
4	Male	100	47.62	20	9.52	90	42.86
	Female	91	48.40	0	0.00	97	51.60
	Both	191	47.99	20	5.02	187	46.99
5	Male	98	36.70	20	7.49	149	55.81
	Female	159	54.08	12	4.08	123	41.84
	Both	257	45.82	32	5.70	272	48.48
Total	Male	198	41.51	40	8.39	239	50.10
	Female	250	51.87	12	2.49	220	45.64
	Both	448	46.72	52	5.42	459	47.86

Table 2 The distribution of children according to relationship of primary terminal plane by gestational age and birth weight.

Primary terminal plane	Gestational age				Birth weight			
	Full term		Pre term		Normal birth weight		low birth weight	
	No.	%	No.	%	No.	%	No.	%
Mesial step	343	46.73	105	46.67	382	46.14	66	50.38
Distal step	36	4.90	16	7.11	48	5.80	4	3.05
Flush terminus	355	48.37	104	46.22	398	48.06	61	46.57

Discussion

There are no previous available Iraqi studies dealing with prenatal nutritional measurement (gestational age, birth weight) in relation to oral health conditions that can be used to compare the results of this study with.

However in the present study the prevalence of preterm children was 23.46 %, this percentage was higher than that found by Offenbacher (1999) in Turkey 17 and Blanc (2005) in United States 18. On the other hand the prevalence of low birth weight in the present study was 13.66% that was lower than that found by Allen

(2001) in Canadian 18, and Blanc (2005) in USA 19. These differences may attributed to the difference in the whole environments of the pregnant women that include nutritional status of the pregnant women, their general health, their social class, ethnic group, and their oral health 20, 21, 22, 23.

There was no available Iraqi study concerning occlusion of primary teeth in preschool children to compare our result with. However the percentage of flush terminus plane was the more prevalent type for the total sample, the flush terminus plane indicate or predict the normal occlusion later on in permanent teeth 16, in addition the most prevalent type of primary terminal plane among preterm and low birth weight was mesial step in the present study, while among full term and normal birth weight was the flush terminus. This may attributed to the fact that poor nutrition in pre and post natal period highly affect the development of mandible and position of teeth 24.

Conclusion

Flush terminus was the most prevalent type of occlusion (47.86%). Among preterm and low birth weight children the mesial step terminus was the most prevalent type of occlusion

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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