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Research Article

COMPARISON OF ORAL HEALTH STATUS AMONG ANAEMIC AND NON- ANAEMIC CHILDREN OF RAICHUR DISTRICT, KARNATAKA

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A B S T R A C T

Aim: Anaemia prevalence in young children continues to remain over 70% in most parts of India and Asia. The aim of the present study is to assess the oral health status of anaemic and non anaemic children in the age group of 6 to 12 years in Raichur District, Karnataka.
Materials and Methods: The oral health status of 75 anaemic and 75 non-anaemic children in the age group of 6-12 years were examined for Decayed, missing, filled teeth [dmft] and Oral hygiene index- simplified. The children were examined for haemoglobin levels, in accordance with the World Health Organization (WHO) criteria.
Results: The frequency of dental caries in anemic children was slightly higher; OHI-S value was significantly higher in anemic children than that of non anemic children. The comparison of dmftindex within the anemic groups was also found to be statistical significant. Similarly the comparison of OHI-S index within the anemic groups was also found to be statisticalsignificant.
Conclusion: The present study showed higher dmft and OHI-S index in Anaemic children. There was a significant inverse association between the dmftand OHI-S index in comparison with haemoglobin levels. Our study of assessing the oral health of children with anaemia and comparing it against non-anaemic children is the first kind of study in the literature. The scope of the study to access the oral health status in addition with diet analysis, medication and oral hygiene habits in Anemicchildren.

INTRODUCTION

Anaemia prevalence in young children continues to remain over 70% in most parts of India and Asia despite a policy being, in place and a program that has been initiated for a longtime.[1]

Nutritional anaemia is the most common form of malnutrition and includes a lack of minerals and nutrients, such as folic acid, iron, copper and vitamins A, B, C, and E. Furthermore, iron deficiency anaemia (IDA), which is defined as circulating haemoglobin with insufficient iron, represents 90% of all types of anaemia worldwide. The World Health Organization has determined haemoglobin levels at which concentrations, healthcare providers can confidently diagnose anaemia are:

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- 11 g/dL or below in patients aged 5 years oryounger,
- 11.5 g/dL or below in patients aged 5 to11 yearsand
- less than 11 g/dL in elderly patients.[2]

These medically compromised patients are more vulnerable to systemic and dental diseases. The lifestyle and continuous hospitalisation of anaemic children raises the prevalence of dental caries as a result of improper oral hygiene. The continuous use of specific medications in anaemic children can also affect Oral health status.[3]

Tang *et al*. (2013)[4] and Medhat *et al*. (2016)[2] described dental caries in relation to nutritional factors among pre-school children. The researchers also state that children with dental caries were recognized as being iron deficient and anaemic. Further there is utmost need of individual training in oral care and plaque control in order to reduce the prevalence of dental caries among anaemic children worldwide.[2] Thus the aim of the present study is to assess the oral hygiene status of anaemic

and non anaemic children in the age group of 6 to 12 years in Raichur District, Karnataka.

MATERIALS & METHODS

The oral hygiene status of 75 anaemic and 75 non-anaemic children in the age group of 6-12 years, who presented at the outpatient department of different Hospitals in Raichur district over a period of 6 months, has been examined.

The study protocol was approved by the Institutional Ethical Committee. Voluntary informed written permission was obtained from the study participants after explanation of the nature of the study.

Inclusion criteria

Paediatric anaemic patients aged 6-12 years with clinical and laboratory diagnoses of iron deficiency anaemia who could tolerate intra-oral examination were included in the study. Anaemia is confirmed through haematological examination of the child by the qualified doctor. Non- anaemic children in the same age group were taken as control group.

Exclusion criteria

Children with medical problems, mental or physical disabilities, and those who had been born prematurely were excluded. Other systemic diseases or factors that precluded oral examination were also excluded. The oral health status was evaluated by various indices which include:

- Decayed, missing, filled teeth[dmft]
- Oral hygiene index-simplified

Haematological Examination

- The children were examined for haemoglobin levels, in accordance with the World Health Organization (WHO) criteria.
- Haemoglobin levels of 11.5 g/dL or below in patients aged 5 to11 years were considered as Anaemic.

Statistical analysis

The data was collected over a period of 6 months from May to October 2017. Data was analyzed using SPSS v16.0 software package. Descriptive statistics such as mean, standard deviation, and percentage were used. Association was evaluated using Chi-square test and ANOVA. Any *p*value less than 0.05 was considered as significant.

RESULTS

The frequency of occurrence of decayed, missing and filled teeth were higher in anemic children from that in non-anemic children, however there was no statically significant difference (Table1).

Table 1 Descriptive statistics of dmft shown between study and control group

GROUP	N	Mean	St.dev	χ^2-value	p-value	Result
Anemic	75	2.07	1.03			
Non-Anemic	75	0.72	0.67	41.04	0.99	NS

The OHI-S value was significantly higher in anemic children than that in non-anemic children (Table2).

Table 2 Descriptive statistics of OHI-S shown between study and control group.

Group	N	Mean	St. Dev	t-value	P-value	Result
Anemic	75	1.81	0.84	8.285	<0.0001	HS
Non-Anemic	75	0.92	0.41			

Anemic patients were categorized into anemic groups based on Haemoglobin levels into very low, low and minimal (Table 3).

Table 3 Anemic patients categorized based on Haemoglobin levels

Sl no	Anemic Groups	Levels of Hb	Total number
1.	Very low	2-4	44
2.	Low	5-7	20
3.	Minimal	8-10	12

The comparison of dmft index within the anemic groups was also found to be statistical significant. Further dmft was found to be more in Very low haemoglobin levels anemic patients (Table 4).

Table 4 Descriptive statistics of dmft in Anemic groups

Group	N	Mean	St.dev	ANOVA	p-value	Result
Very low	44	2.16	1.06			
Low	20	1.60	0.68	3.656	0.031	S
Minimal	12	2.55	1.21			

Similarly the comparison of OHI-S index within the anemic groups was also found to be statistical significant (Table 5).

Table 5 Descriptive statistics of OHI-S in Anemic groups

Group	N	Mean	St.dev	ANOVA	p-value	Result
Very low	44	1.85	0.41			
Low	20	0.89	0.24	173.723	<0.0001	HS
Minimal	11	3.35	0.27			

However comparison of OHI-S "Good" score between anemic and non-anemic children was not statistically significant. Further, OHI-S "Fair" score between anemic and non-anemic children was statistically significant (Table 6).

Table 6 Descriptive statistics of OHI-S score between study and control group

Group	Anemic patients	Non-Anemic	Mean	St. Dev	$\chi 2$-value	P-value	Result
Good	44	66	0.83	0.26	8.8	0.267	NS
Fair	20	9	1.83	0.4	20.364	0.041	S
Poor	11	0	3.35	0.27		NA	

DISCUSSION

The decay-missing filled teeth (dmft) index is one of the most common tools used in the dental community to assess the distribution of dental caries and treatment plan demands for children. There is minimal data available regarding the relation between thedmft index and Hb levels.[3] Hence the present study was conducted to evaluate dmft and oral Hygiene index in Anaemic Children of Raichur District.

In the present study, there was higher difference in dmft indices between the anaemic and non-anaemic groups. Inappropriate diets in children with Anaemia may halt dental development and increase the risk of future caries. This finding was supported by the observations of the study done by Medhat *et al* in 2016.[2] Oral hygiene status was found to be deteriorated inanaemic children than non- Anaemic children. The differences in OHI-S index between the anaemic children

than non- Anaemic children were found to be highly significant.

Children with lower mean haemoglobin levels had a significantly higher mean dmft index and OHI-S index than did non-anaemic children. Tang *et al*. has shown the association between serum iron levels and early child caries (ECC) in children.[4] Furthermore, Medhat *et al*. has shown that dental caries may be considered an indirect factor for low levels of haemoglobin.[2]

Anaemia can be caused by several factors, including dietary, genetic (congenital), environmental and inflammatory processes. Children with Anaemia and iron deficiency may have higher rates of dental caries and decreased oral hygiene status.[5]

Causes of decreased Oral health status in Anaemic children are

- Children, who consume cow's milk excessively, may show reduced absorption of iron.
- In addition, children with untreated caries that often cause pain or discomfort, and
- Thus have difficulty in chewing certain iron- and vitamin-C rich foods, such as red meat and citrus fruits, respectively.
- Furthermore, children with severe dental caries may suffer from acute or chronic inflammation, resulting pulpitis and periapical abscess and fistula, and
- Such inflammatory complications may induce the production of cytokines that suppresses the erythropoiesis and leading to decreased synthesis of Haemoglobin.[6-8]

There are some factors that were not part of many studies such as diet analysis, medications and oral hygiene habits; all of these variables should also be added. Studies showed that there is significant resolution of dental caries leads to a parallel resolution of iron deficiency anaemia. Lastly Young children with caries are physically underdeveloped, especially in height and weight. Thus dentistry has an obvious role in preventing medical and dental complications for anaemic children. There can be no doubt that oral health can have a strong influence on individual quality of life.[2, 9, 10]

CONCLUSION

The present study showed higher dmftand OHI-S index in Anaemic children. There was a significant inverse association between the dmftand OHI-S index in comparison with haemoglobin levels.

Our study of assessing the oral health of children with anaemia and comparing it against non-anaemic children is the first kind of study in the literature. The scope of the study to access the oral health status in addition with diet analysis, medication and oral hygiene habits in Anemic children.

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