GENERAL HEALTH STATUS OF EGYPTIAN CHILDREN WITH EARLY CHILDHOOD CARIES:

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ABSTRACT

Objectives: The purpose of this study was to clarify the correlation between early childhood caries (ECC), body mass index and iron deficiency anemia.

Methods: The study was conducted on 80 apparently healthy Egyptian children with ECC attending the Outpatient clinic in Pediatric and Community Dentistry Department, Faculty of Oral and Dental Medicine-Cairo University. Dental examination was done for each child followed by anthropometric measurement and Laboratory analysis. Statistical analysis was performed with IBM SPSS Statistics Version 20 for Windows. The significance level was set at P ≤ 0.05.

Results: Traumatic stage was the most prevalent stage among ECC children. There was no statistically significant association between BMI status and ECC stages. There was no statistically significant association between prevalence of iron deficiency anemia and ECC stages.

Conclusions: ECC population isn’t at risk for iron deficiency anemia. ECC patients seek dental treatment at a late stage of the disease.

INTRODUCTION

ECC has been a major public health problem over many years and still continues today, affecting in many ways normal growth and development as well as social adaptation of young children.

American Academy of Pediatric Dentistry 2011 defined ECC as the presence of one or more decayed teeth, missing teeth (resulting from caries), or filled tooth surfaces in any primary tooth in a child 6 years old or younger.

Kranz et al reported that high sucrose diets may be low in micronutrients, influence nutrient intake and thus affect the general health condition of children with ECC.
Sheller et al and Clarke et al found that significant number of children with severe early childhood caries were underweight4,5. Results of Gaur and Nayak, showed that the mean values of anthropometric measurements were less in S-EEC group as compared to the controls6. Recently, Costa et al found significant association between dental caries and obesity7.

Some ECC may also be associated with iron deficiency. The study conducted by Clarke et al showed that all tests detected levels of malnutrition, with blood tests finding the most severe cases5. While the study conducted by El Motayam et al in Egypt showed acceptable level of ferritin in the blood8. Recently Koppal et al and Schroth et al concluded that ECC and iron deficiency anemia are definitely interrelated9,10.

So the aim of this study was to clarify the correlation between early childhood caries, body mass index and iron deficiency anemia in healthy Egyptian children.

SUBJECTS AND METHODS

80 apparently healthy Egyptian children with ECC attending the Outpatient clinic in Pediatric and Community Dentistry Department, Faculty of Oral and Dental Medicine-Cairo University were enrolled in the study. Age ranged between two to five years.

All the procedures were explained to the parents or guardians prior to the investigation and an informed consent was given to the parents or guardians to get their approval for work.

Dental examination

Each child was examined on a dental unit in the Outpatient clinic using a sterile mirror and probe and the stage of ECC was determined.

Data collection

Anthropometric measurements were conducted to each child including height and weight. For these measurements, children wear light clothing & stocking feet.

Measuring Weight: Weights of subjects were taken by using digital weight scale. The children were asked to stand still with both feet in the center of the platform and the weight was taken and recorded.

Measuring Height: a stadiometer from SECA measurement company devices was used. We asked the child to remove any hair accessories that interfere with the measurement.

Two to three years old patients were sent to Abou-El Reish hospital to measure their height and weight using special weight scale and stadiometer suitable for their age.

Body mass index was calculated for each child & compared to the normal percentiles values of the Egyptian population11.

Data conversion for comparison with reference values

The anthropometric measurements were converted with several calculations as follows:

Body mass index (BMI): BMI uses weight and height measurements (kg/m²) to determine if weight is appropriate for height. The calculation was plotted on age and gender specific charts. The resulting percentile category for the calculation was categorized into levels of overweight, healthy, or malnutrition using Egyptian growth charts 2002.

For each child, a blood sample was collected and analyzed by a nurse in Clinical Pathology Department, Kasr Al Aini Hospital. The results were compared to reference values for the age range 2-6 years.

Ferritin test was done for the anemic children & the results were compared to reference values for the age range 2-6 years.
Children with ferritin measurement less than 10 ng/ml were diagnosed by having iron deficiency anemia (Clinical Pathology Department, Kasr Al-Aini Hospital).

RESULTS

Results showed that the most prevalent stage was the traumatic stage, followed by the deep stage then the damaged stage and finally the initial stage.

Anthropometric data showed that 10 children were under-weight representing 12.5% of the study sample, 46 children had normal weight representing 57.5% of the study sample, 10 children were overweight representing 12.5% of the study sample while 14 children were obese representing 17.5% of the study sample as shown in figure (1). There was no statistically significant association between BMI status and ECC stages.

Results of the blood analysis showed that 58 children were normal representing 72.5% of the study sample, 22 children had anemia representing 27.5% of the study sample. 16 children had iron deficiency anemia representing 20% of the study sample.

There was no statistically significant association between prevalence of anemia and ECC stages and there was no statistically significant association between prevalence of iron deficiency anemia and ECC stages as shown in figure (2) and figure (3).

DISCUSSION

Early childhood caries (ECC) is the most prevalent chronic childhood disease, representing a public health problem that affects infants and preschoolers Worldwide. Thus the aim of this study was to clarify the correlation between early childhood caries, body mass index and iron deficiency anemia in healthy Egyptian children.

Participants were required to be apparently healthy to exclude the presence of any systemic disease that may affect the anthropometric & blood results.
In order to investigate the children’s nutritional status, we used the anthropometry which is the single most universally applicable, inexpensive and non-invasive method in agreement with Gaur and Nayak. Body mass index (BMI) was used in this study as it is more reliable than the weight alone in the assessment of growth and development in accordance with Clarke et al. Children diagnosed by being under weight, overweight or obese were referred to Abou El Reesh hospital seeking medical treatment.

One of the most commonly used screening methods for the presence of anemia in a population is the measurement of hemoglobin. This measurement is relatively simple, cheap and can be carried out under field conditions in agreement with WHO. Thus, for each child, a blood sample (approximately 3ml) was collected by a nurse in the Clinical Pathology Department, Kasr Al Aini Hospital to ensure painless acupuncture as these nurses were highly trained in taking blood samples from young children, besides the accessibility of the Clinical Pathology Department to the dental clinics and finally to ensure the high accuracy of the blood tests. Children with hemoglobin values less than 11 g per dL were diagnosed as being anemic in agreement with WHO. Serum ferritin measurement was further done for anemic patients as it’s the most accurate initial diagnostic test for iron deficiency anemia according to Schroth et al.

Determination of the ECC stage was quite difficult, especially in the differentiation between the damaged and deep stage as they both depend on clinical examination and taking history of pain from the patients. Since most of the children were really young, all effort was done to make proper diagnosis.

All the children were referred to the dental clinics in the Pediatric and Community Dentistry Department, Faculty of Oral and Dental medicine, Cairo University to undergo their dental treatment.

Results of the underweight were similar to the results of Sheller et al but they differed than the results of the studies conducted by Clarke et al and Vania et al. This may be due to the difference in dietary habits and environmental differences between the Egyptians, Canadian and Italian children. It also differed from the study conducted by El Motayam et al in Egypt. The difference regarding weight in the present study may be due to decreased socioeconomic status of the study sample or due to increased unhealthy food choices.

Results of the overweight were similar to Sheller et al but they differed than the results of Clarke et al and Vania et al. This may be due to the difference in dietary habits and environmental differences between the Egyptians, Canadian and Italian children.

Results of the obesity were different that the results of the studies conducted by El Motayam et al, Vania et al and Costa et al. The results showed shift towards more obesity in comparison to El Motayam et al and Vania et al. This could be explained by that some of the food choices and eating behaviors that can put an individual at risk for unhealthy weight were also risk factors for dental caries.

The results of the iron defeciency were different from the studies conducted by Clarke et al, Koppal et al and Schroth et al. This difference may be due to ethnic, dietary or experimental variables.

The results of the present study were also different from the study conducted by El Motayam et al, in their study all children showed acceptable level of ferritin. This may be attributed to the large sample of the present study (80 children versus 20 children in the previous study).

Results of the prevalence of the stages of ECC showed that traumatic stage was the most prevalent. This might be explained by the fact that the patients who seek treatment in Pediatric and Community Dentistry Department usually come at a late stage of...
the disease, when their children start complaining from pain on chewing on their posterior teeth. What was really surprising that the initial stage wasn’t seen at all. This also reveals the lack of education, awareness and poor socioeconomic status of the parents.

The results also showed no statistically significant association between ECC stages and the prevalence of anemia and iron deficiency anemia. This might be explained by that dental caries might be a co-factor in the development of anemia or iron deficiency anemia as it affects the eating pattern of the child, but not the sole cause.

CONCLUSION

1. ECC population isn’t at risk for iron deficiency anemia.
2. ECC patients seek dental treatment at a late stage of the disease.

RECOMMENDATIONS

1. The goal for both physicians and dentists should be the prevention, timely diagnosis, and treatment of the children suffering from ECC.
2. Further research and studies are needed to determine the correlation between ECC and BMI on a larger scale.
3. Special attention should be given to the general health status of Egyptian children with early childhood caries due to the low socioeconomic level & lack of regular visits to the pediatricians.

REFERENCES

11. Egyptian Growth charts. Source: Cairo University. Diabetic, Endocrine and Metabolic Pediatric Unit and the National Research Centre- Cairo, in collaboration with Wright State University. School of Medicine. Department of Community Health Lifespan. Health Research Centre, 2002.