Feeding Practice, Oral Hygiene Habits and Its Relation to Dental Caries among Sample of School Aged Egyptian Children

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ABSTRACT

Background: Dental caries is a global public health problem and influence the overall health of children. The risk factors for caries include biological, socio-behavioral and environmental factors. This cross-sectional study assessed dental caries and their associations with oral hygiene practices and eating habits among Egyptian children. Methods: This cross sectional study conducted in Cairo Egypt, the sample consisted of 750 primary school children aged 6-12 years, oral examination was done according to WHO criteria, and eating and oral hygiene questionnaires was completed by their parents. Results: Distribution of dental caries was higher in children who ate snacks and sweets and don’t brush their teeth, higher in females than males, and in group I (6-9) than group II (9-12). Conclusion: there was weak positive significant difference between dental caries and dental office consultation and tooth brushing renewal frequency, but there was insignificant correlation between dental caries and other eating and oral hygiene habits.

Keywords: dental caries, oral hygiene habits and eating habits.

1. Introduction

Dental caries is a multifactorial problem affected by a collection of factors such as orodontal hygiene, salivary characteristics, socioeconomic status, low awareness among parents, ethnicity, age, dental anatomy and arrangement, limited access to dental health-care services, and hereditary factors, (Bahrololoomi et al., 2017).

Dental caries is a biofilm-mediated, diet modulated, multifactorial, non-communicable, dynamic disease resulting in mineral loss of dental hard tissues. It is determined by biological, behavioral, psychosocial, and environmental factors. Caries lesion develops as a consequence of this process, (Machiulskienea et al., 2020).

Nutrition plays an important role in the epidemic of obesity. Beside obesity, high carbohydrate consumption frequency and overconsumption of glucoses are reported as effective for caries development (Sakeenabia et al., 2012).
2. Subject and method

This cross sectional study was conducted in Cairo, Egypt. The study sample included 750 school age children of both sexes. Samples were collected from primary schools and hospitals, and children aged between 6-9 years and 9-12 years (250 male, 320 female) and 9-12 years (85 male, 95 female).

• Inclusion criteria
 Apparently healthy children free, from genetic disorders, and any systemic or chronic diseases (from school medical insurance files).

• Exclusion criteria
  - Children with history of any chronic or genetic diseases.
  - Children less than 6 years or more than 9 years.
  - Non Egyptian children.

Every child was subjected to
1- Clinical examination of the children
A- Dental examination
  Dental examination of children was done by using light torch with a disposable probe and mouth mirror. Visible caries on tooth surface were registered.

  A semi structured chart was designed for detection of dental caries according to WHO (2013) criteria, using the dft (decayed, filled primary teeth) and DMFT (Decayed, Filled, Missed Permanent teeth) values. Missing primary teeth (m= missing) will not be registered because the examined children were expected to be in the mixed dentition stage making it hard to identify the exact reason for missing primary teeth according to Ahmed and Abuaffan, (2015).

B- Children’s diet (eating habit) and oral hygiene habits
  Children’s diet and oral hygiene habits were assessed according to Baccouche et al. (2017), in terms of meals, sweets consumption and oral hygiene.

3. Results

3.1. Association between dental caries, eating and oral habits
I. Eating habits
  In question 1(Q1) “yes” answer was significantly higher than “no” answer in both categories of DMF and dft in both groups. In Q2, answer “yes” was significantly higher than answer “no” in both DMF and dft categories in both groups. In Q 3 answer “2” was significantly the highest while answer “1” was significantly the lowest in both DMF & dft categories in both groups except in “with caries” in group II dft, “3” was significantly the lowest as it is shown in table 1.

II. Sweet habits
  In Q4 “yes” answer was significantly higher than “no” answer in both categories of DMF and dft in both groups. In Q 5, answer “1” was significantly the highest in DMF (no caries 43.8%) category in group I, (no caries category 33.8% and with caries category 36.7%) in group II, while answer “3” was significantly the highest in (with caries) category in group I. For dft, answer “1” was significantly the highest in group I for both categories (56.7% no caries, 35.2% with caries), in group II no caries category, “2” was the highest 39.4%, while “3” was the highest in with caries category 37.5%. While (every week) was the lowest in DMF and dft in both groups. In Q6 (chocolate) was significantly the highest in DMF and dft except in DMF (no caries) category group II (others) was the highest and in dft (no caries) category group II (more than one type) was the highest. (Candy) was the lowest in DMF and dft except in DMF, (no caries) category group II and dft (with caries) category, (biscuit) was the lowest as it is shown in table 2.
Table 1: Association between dental caries and eating habits in both groups of Egyptians

| Table 2: Comparison between dental caries and sweet habits in both groups of Egyptians | 6-9 years | 7-12 years |
|-----------------------------------|-----------|-----------|
| No caries | With caries | P value | No caries | With caries | P value |
| Q1 Snaking | No | 150 | 35.1 | 37 | 25.9 | 17 | 23.9 | 34 | 31.2 |
| 3 meals per day | Yes | 277 | 64.9 | 106 | 74.1 | --- | 54 | 76.1 | 75 | 68.8 |
| Number of sweets | Q1 | 88 | 20.6 | 20 | 14 | 10 | 14.1 | 22 | 20.2 |
| Q2 Snaking | No | 34 | 8 | 14 | 9.8 | 8 | 11.3 | 10 | 9.2 |
| Yes | 393 | 92 | 129 | 90.2 | --- | 63 | 88.7 | 99 | 90.8 |
| Number of sweets | Q3 | 1 | 18.2 | 20 | 14 | 10 | 14 | 22 | 20.2 |
| Q4 Snaking | No | 12 | 11.5 | 36 | 7.7 | 7 | 9.2 | 12 | 11.5 |
| Yes | 92 | 88.5 | 430 | 92.3 | --- | 69 | 90.8 | 92 | 88.5 |
| Number of sweets | Q5 | 1 | 12 | 11.5 | 36 | 7.7 | 7 | 9.2 | 12 | 11.5 |
| Q6 Snaking | No | 12 | 11.5 | 36 | 7.7 | 7 | 9.2 | 12 | 11.5 |
| Yes | 92 | 88.5 | 430 | 92.3 | --- | 69 | 90.8 | 92 | 88.5 |
| Number of sweets | Q7 | 1 | 12 | 11.5 | 36 | 7.7 | 7 | 9.2 | 12 | 11.5 |
| Q8 Snaking | No | 12 | 11.5 | 36 | 7.7 | 7 | 9.2 | 12 | 11.5 |
| Yes | 92 | 88.5 | 430 | 92.3 | --- | 69 | 90.8 | 92 | 88.5 |
III. Oral hygiene habits

In Q7, “never” was significantly the highest in the DMF (42.2% no caries, 49.7% with caries in group I and 64.8% no caries, 57.8% with caries in group II) and dft (47.1% no caries, 43.3% with caries in group I and 64.5% no caries, 57.7% with caries in group II), while “3” was significantly the lowest in DMF (1.6% no caries, 1.4% with caries in group I and 1.4% no caries, 0% with caries in group II) and in dft (1.9% no caries, 1.9% with caries in group I and 2.6% no caries, 0% with caries in group II). In Q 8, “> 6 m” was significantly the highest in DMF (51.5% no caries, 65% with caries in group I and 49.3% no caries, 49.3% with caries in group II) and dft (47.1% no caries, 43.3% with caries in group I and 64.5% no caries, 57.7% with caries in group II), while “<3” was significantly the lowest in DMF (22.2% in no caries group I, 16.9% no caries and 22% with caries group II) and dft except (3-6) was the lowest in with caries group I in DMF (13.3%) and dft (22.1%). In Q 9, “never” was significantly the highest in DMF and dft except in DMF (49%) and group II (48.6%), and in dft (with caries) category in group I and both categories in group II “< 1” was the highest, while “each year” was the lowest in DMF and dft except in (with caries) group I in DMF and with caries group I in dft (<2) was the lowest as it is shown in table 3.

Table 3: Comparison between dental caries and oral hygiene habits in both groups of Egyptians

| Frequency | No caries | With caries | r     | P value  |
|-----------|-----------|-------------|-------|----------|
| Q7        |           |             |       |          |
| Dental brushing frequency |           |             |       |          |
| Never     | 180       | 42.2        | 71    | 49.7     | 0.001* |
| 1         | 177       | 41.5        | 51    | 35.7     | 0.001* |
| 2         | 63        | 14.8        | 19    | 13.3     | -0.06  |
| 3         | 7         | 1.6         | 2     | 1.4      | 0      |
| Q8        |           |             |       |          |
| Toothbrush renewal frequency |           |             |       |          |
| <3 m      | 95        | 22.2        | 31    | 21.7     | 0.001* |
| 3-6 m     | 112       | 26.2        | 19    | 13.3     | 0.11   |
| ＞6 m      | 220       | 51.5        | 93    | 65       | 0.01   |
| Q9        |           |             |       |          |
| Consultation in the dental office |           |             |       |          |
| <1        | 206       | 48.2        | 50    | 35       | 0.001* |
| <2        | 148       | 34.7        | 70    | 49       | 0.001* |
| each year | 17        | 4           | 9     | 6.3      | 0.07   |
| ＞2years  | 37        | 8.7         | 7     | 4.9      | 0.01   |
| P value   | 0.001*    | 0.001*      | 0.01  |           |
| Q7        |           |             |       |          |
| Dental brushing frequency |           |             |       |          |
| never     | 49        | 47.1        | 202   | 43.3     | 0.001* |
| 1         | 36        | 34.6        | 192   | 41.2     | 0.001* |
| 2         | 17        | 16.3        | 65    | 13.9     | -0.1   |
| 3         | 2         | 1.9         | 7     | 1.5      | 0.001* |
| Q8        |           |             |       |          |
| Toothbrush renewal frequency |           |             |       |          |
| <3 m      | 20        | 19.2        | 106   | 22.7     | 0.04   |
| 3-6 m     | 36        | 33.9        | 104   | 22.1     | 0.04   |
| ＞6 m      | 48        | 46.2        | 257   | 55.2     | 0.015* |
| P value   | 0.001*    | 0.001*      | 0.01  |           |
| Q9        |           |             |       |          |
| Consultation in the dental office |           |             |       |          |
| <1        | 70        | 67.3        | 186   | 39.9     | 0.22   |
| <2        | 5         | 4.8         | 21    | 4.5      | 0.196* |
| each year | 3         | 2.9         | 22    | 4.7      | 0.04   |
| ＞2years  | 3         | 2.9         | 41    | 8.8      | 0.01   |
| P value   | 0.001*    | 0.001*      | 0.01  |           |
IV. Inter and intra-relationship
Comparing male & female in both DMF and dft categories (intra-relationship) revealed significant difference in both categories of DMF and dft except in “with caries” DMF category where the difference was insignificant. Female was significantly higher than male in all as presented in table (4).

Table 4: Comparison between frequency and percentages of distribution of DMF, dft categories among male & female.

|          | Male               |         | Female              |         | P value |
|----------|--------------------|---------|---------------------|---------|---------|
|          | N                  | %       | N                   | %       |         |
| DMF      | No caries          | 182     | 42.62%              | 245     | 57.38%  | 0.001*  |
|          | With caries        | 68      | 47.55%              | 75      | 52.45%  | 0.49    |
| dft      | No caries          | 39      | 37.50%              | 65      | 62.50%  | 0.001*  |
|          | With caries        | 211     | 45.28%              | 255     | 54.72%  | 0.006*  |

Comparing both groups in each gender in both DMF categories (inter-relationship) revealed significant difference in both categories of DMF & dft. Group I (6-9 years) was significantly higher than group II (>9-12 years) as presented in table (5).

Table 5: Comparison between frequency and percentages of distribution of DMF categories in sex among different groups in Egyptians

|          | Male               |         | Female              |         | P value |
|----------|--------------------|---------|---------------------|---------|---------|
|          | N                  | %       | N                   | %       |         |
| DMF      | No caries          | 182     | 81.25               | 42      | 18.75   | 0.001*  |
|          | With caries        | 245     | 89.42               | 29      | 10.58   | 0.001*  |
|          | Male               | 68      | 61.26               | 43      | 38.74   | 0.006*  |
|          | Female              | 75      | 53.19               | 66      | 46.81   | 0.004*  |
| dft      | No caries          | 39      | 59.09               | 27      | 40.91   | 0.02*   |
|          | With caries        | 65      | 57.02               | 49      | 42.98   | 0.03*   |
|          | Male               | 211     | 78.44               | 58      | 21.56   | 0.001*  |
|          | Female              | 255     | 84.72               | 46      | 15.28   | 0.001*  |

4. Discussion
Due to the multifactorial nature of dental caries, the salivary properties, oral hygiene frequency, and nutritional status of the patients should be recorded in order to establish their roles as risk factors in the development of dental caries, (Bud et al., 2021).
A multifactorial disease development model is assumed for ECC. Increasing importance is attributed to psychosocial risk factors, such as maternal psychopathologies, educational deficits and poverty (Knoblauch et al., 2019).

This study was conducted to answer an important question “Is there an association between dental caries and oral hygiene and eating habits? which are considered risk factors that may affect both dental and general health conditions of the child with the result of so many difficult burdens on the child, the family as well as the community in general.

Eating habits
For association between dental caries & eating habits, our findings revealed that in Q1 and 2, answer “yes” was significantly higher than “no” in DMF and dft. In Q 3, “2” was significantly the highest in DMF and dft, while “1” was significantly the lowest in all groups except in “no caries” group I in DMF and “with caries” in group II dft, “3” was significantly the lowest. Correlation between dental caries and eating habits revealed insignificant correlation in both groups regarding DMF and dft. (Dwyer et al., 2001) in his study found that teenagers who miss breakfast are more likely to snack during the day and snacks have the highest sugar content of any type of meal (that is, breakfast, lunch, dinner or snacks). (Johansson et al., 2010) found that nearly all children (97%) were reported to eat snacks most days, he found that caries was significantly more prevalent among children who ate chips, dry cereals and dried fruit, but snack like fresh fruit, crackers and yoghurt, however, were not associated with caries, also (Iftikhar et al., 2012) suggest that young children with poor dietary habits consuming snacks frequently were more likely to develop caries as compared to children with no snacking habits.
Sweat habits

In question 4 “yes” answer was significantly higher than “no” answer in both categories of DMF and dft in both groups. In question 5, answer “1” was significantly the highest in “no caries” category in group I DMF and group I both categories in dft, answer “3” was significantly the highest in “with caries” category in group I DMF and “with caries” group II in dft. In group II DMF, “1,2” answers were significantly the highest in “no caries”, in dft “no caries” group II answer “2” was the highest, while in DMF group I (with caries), dft “with caries) group II answer “1” was significantly the highest while “every week” was significantly the lowest in both groups regarding “no caries” and “with caries” in DMF and dft. In Q6 “chocolate” was significantly the highest in DMF and dft except “others” was significantly the highest in (no caries) category in DMF group II and (more than one type) was the highest in “no caries” dft group II, while “candy” was significantly the lowest in both DMF and dft except in DMF “no caries” group II and in dft “with caries” group II as biscuits was the lowest. Correlation between dental caries and sweet habit showed insignificant correlation in all questions. (Mohamed et al., 2020) in Egypt also found that the frequent consumption of sugars, especially sweets, fruit drinks and desserts could be associated with higher socioeconomic.

Oral hygiene habits

In Q7, “never” in DMF (64.8%) and dft (64.5%) was significantly the highest in all group categories, while “3” was significantly the lowest in all DMF and dft in all groups. In Q 8, “> 6 m” was significantly the highest in both groups in DMF and dft, while “<3”) was the lowest in all categories except in DMF and dft “with caries” category group I “3-6 m” was the lowest “3-6” was the lowest in all DMF groups except (no caries) of group I “<3” was significantly the lowest (22.2%), also “<3” was the lowest in both groups of dft in Egyptians except (with caries) of group I as “3-6 m” was the lowest (22.1%). For Sudanese in DMF group I “<3m” was the lowest in both categories (27.1%) but “3-6m” was the lowest in group II both categories (16.4%), for dft group I, “>6m” was the lowest in no caries (25.2%) and “<3m” in with caries (24.1%) but “3-6 m” was the lowest in both categories of group II (14.8%). In Q 9, DMF “never” was significantly the highest in both groups “no caries” category of both groups and in dft “no caries” group I, while “< 1” was the highest in both groups “with caries” category of DMF (49%) and all other categories of dft (44.2%), while “each year” was significantly the lowest in all DMF and dft except DMF and dft in “with caries” group I as “>2 years” was the lowest (4.9%). There was insignificance correlation between DMF and dft with all questions except Q (9) in DMF group II and in dft both groups and Q (8) in dft group I. Our finding goes with (Ghasemianpou et al., 2019; Kumar et al., 2016), they found that reverse associations were found between higher frequency of tooth brushing with dental caries indices in both age groups.

Intra and interrelationship of dental caries

By comparing between group I (6-9) and group II (9-12) ( inter-relationship), it was found that group I was significantly higher than group II, our result goes with (Mulu et al., 2014) that found that the majority (75%) had primary tooth decay. This finding could be due to presence of many primary teeth present in the oral cavity compared to permanent teeth. By comparing between sex (intra-relationship), it was found that female was significantly higher than male in all except (>9-12 years) age range in (no caries category of DMF and (with caries category of dft).

Limitations of this study

Covid 19 pandemic was one of the most difficult challenges we met which was a barrier for our entrance in schools.

Conflict of interests

There was no conflict of interests in this study.

Conclusion

It can be concluded that there is relationship between dental caries, eating and oral hygiene habits. In Q 8 (tooth brushing renewal frequency) in dft group I and Q 9 (consultation in dental office) the
correlation was significant weak positive, while all other questions were insignificant. Group I (6-9) was significantly higher than group II, females were significantly higher than males.

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