ABSTRACT

Background: Data from numerous epidemiological studies revealed that the prevalence and severity of periodontal disease is widespread in children and adolescents, with approximately 50% to 100% of 12-years-old children having the signs of gum inflammation.

Aim: This study was designed to assess the role of health education program in improving periodontal health status among primary school students in Duhok governorate.

Participants and methods: The study investigated students 11-15 years old selected from 12 schools out of (892) primary public schools in Duhok governorate. For better socio demographic representation, the schools were purposely categorized into three equal groups representing rural, suburban and urban sectors. Four schools were randomly selected from each of the three sub-counties, two schools were randomly assigned for health education programs with the other two schools regarded as controls. All students of the first 6th grade class from the selected schools were enrolled. Thus a total of 615 students were assigned to intervention and controls (304 and 311 students respectively). A questionnaire was used to obtain information on age, gender, medical diseases and drug history. Utilizing a variety of learning and teaching methods a specially constructed health education program was administered to the intervention group by the researcher. The program included lectures, discussions, practical experiments, group work, problem-solving exercises, debates and role-play with appropriate stimulating visual aids and posters, accompanied by distribution of brushes and paste to the students. This was followed by clinical dental examination for each student. The effects of health education have been evaluated by using two outcome variables namely; Plaque index and gingival index.

Results: The results revealed high scores of plaque and gingival indices at the baseline pre-intervention assessment among the participants. These scores have been reduced significantly at post intervention assessment in the intervention group compared to the controls $p \leq 0.05$. This improvement in the intervention group was maintained at follow up assessment six weeks after the intervention.

Females in the intervention and the control groups exhibited lower mean plaque and gingival scores than males. Both gingival and plaque scores in this study were consistently higher in rural than in urban communities $p \leq 0.05$ (Significant).

Keywords: Gingival index, Health education, Periodontal health, Plaque index, Primary school students

According to data out of several epidemiological studies, periodontal disease affects the majority of children and adolescents worldwide$^{1,2}$. Gingivitis is quite prevalent among older children and adolescents, with 150% to 1100% of 112-year-olds showing indications of gum inflammation$^3$. It's virtually universal.
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among adults\(^4\). Periodontal health is particularly important during adolescence. The periodontium alters throughout puberty, and inflammation arises; however, this could generally be controlled by proper oral health and consistent dental care\(^5, 6\). The aetiology of oral diseases have been well recognized, and the disorders are mostly preventable\(^7\).

Gingival and periodontal diseases are of the most wide spread diseases in the world\(^8\) and are more prevalent in developing countries\(^9\) including Iraqi population\(^10, 11, 12\) and affecting the younger age groups\(^13, 14, 15\). During adolescence, young people are able to assume responsibility for learning and maintaining health-related attitudes and behaviours that carry over into adulthood\(^16\). The school system is the logical environment in which to teach preventive dental health practices\(^4, 6\).

School curriculum in Iraq is devoid from oral health education that resulted in poor knowledge among the students regarding oral health\(^17, 18, 19\). Dental health education intends to improve oral health utilizing educational means, namely the dissemination of information to enhance oral health knowledge\(^2\) and awareness in order to encourage people to adopt a healthier lifestyle, influence their attitudes, and engaged in desired behaviours\(^7\).

The study has been designed to assess the role of health education program in improving periodontal health status among primary school students in Duhok.

PARTICIPANTS & METHODS

Study sample: The study was carried out in Duhok governorate, during the period from the first of February 2009 until the mid of May 2009. According to the Directorate of Education there are (892) primary public schools in Duhok governorate. For better sociodemographic representation the schools were purposely categorized into three equal groups representing rural suburban and urban sectors.

Multistage cluster sampling procedure was adopted to enroll the study sample as follows: In the first stage: Four schools were randomly selected from each of the three sub-counties (rural, suburban and urban). In the second stage: All students of the first 6th grade class from the selected schools were enrolled. In each of the three categorized school groups (rural, suburban and urban) two schools were randomly assigned for health education program with the other two schools regarded as controls. Thus a total of 615 students aged 11-15 years were assigned to intervention and controls (304 and 311 students respectively).

The study compared students who received a health education program with those who didn’t receive the program, regarding pre-specified outcome variables to assess the program role in improving periodontal health status. The outcome variables were measured sequentially on three occasions:

- Pre-intervention baseline assessment of periodontal health.
- Post-intervention assessment after administration of health education program to the intervention group, and is conducted two weeks after the baseline assessment.
- Follow up assessment conducted six weeks after the baseline assessment.

Sample size:

The Power and Sample Size Calculations software (PS version 3.0.12) was used to calculate the required sample size. Below is a graph displaying the computer output showing that 305 students in each group were required to have an 80% chance of
detecting a difference in means of 0.1 (SD 0.44) at a 5% level of significance using the unpaired t test.

![Sample size](image)

**Figure (1): Sample size**

Ethical issues:
After being approved by the Research Ethics Committee at Duhok University, permission was obtained from the directorate of education in Duhok Governorate, and the school authorities of the selected schools have been contacted for explaining the purpose of the study and the procedures that would be followed during its conduct. The students gave their informed written consent to participate in the study.

**Questionnaire:**
In addition to general information the questionnaire includes an assessment of respondents’ oral health and dental care knowledge, attitudes, and behavior. At the beginning, each participant completed a sociodemographic and health-related questionnaire. Then students were unaware of the impending intervention or the dates for the three assessment stages; participation was completely voluntary, and all participants completed the questionnaire (Appendix 1).

**Clinical examination:**
The clinical dental examination was performed by one of the authors who is a specialist dentist under standardized conditions using a disposable mouth mirror, calibrated periodontal probes, masks, and gloves during school hours in the classroom on comfortable chair.

Electricity was not available in several of the schools, therefore, in order to maintain uniform lighting, all examinations were done without artificial lighting i.e. under natural daylight and in most proper position, a full-mouth periodontal examination was performed on each participant, who also answered a questionnaire about socio-demographic and health-related issues. The intra oral examination was performed for all students and the periodontal status of all teeth was assessed. The ultimate goal of clinical examination was to assess the main outcome measures namely; Plaque and Gingival Indices. A special case sheet has been designed to document and calculate the scores of the two indices for each student after clinical examination (Appendix 2).

**Outcome measures:**
Plaque index (PI): An index used to assess plaque accumulation according to the plaque index by Silness and Loe.
Gingival index (GI): Used to assess gingival health, according to the gingival index by Loe and Silness.

**Intervention (Health Education Program):** Utilizing a variety of learning and teaching methods, a specially constructed health education program was administered to the intervention group by the researcher. The program involved lectures, conversations, practical experiments, group discussions, problem-solving activities, debates, and role-playing, as well as arousing posters and visual aids.

The basic program components were the following:
- **Lectures:** Two lectures per week were given for each class. Each lecture lasts about one hour and includes a long list of educational themes regarding oral health.
Posters on dental health: These included brief dental health messages in simple Kurdish language. They were distributed to the classes assigned for intervention.

Tooth brushing skills and effective use of dental floss: Proper brushing and flossing techniques were taught and demonstrated to students of the assigned classes using a tooth brush and large "dental mouth" model.

After completing oral examinations and interviews, all the study participants were given a tube of fluoridated tooth paste and a tooth brush and they were advised to brush at least twice a day.

The topics of both the lectures and the posters were based on the fundamental concepts of recommended oral health prevention\(^1,3,5,7,33,34\). Educational key messages to improve oral cleanliness and gingival health among the study participants were the same in both materials and included: Importance of oral health, role of microbial plaque, frequency and methods of proper tooth-brushing and flossing, importance of regular dental attendance, healthy diet, and proper use of fluorides. Both lectures and posters emphasized the immediate gains from good oral hygiene.

Statistical methods

Data were analysed using the statistical software SPSS, Windows version (16.0). The Chi square association test was used to compare the proportions. Inferential statistics were used to analyze the results. The t-test was used for comparison of the mean scores of plaque and gingival indices between intervention and controls within each group at different stages and to compare gender differences. The paired (dependent) student t-test was used to compare the means of the same sample before and after the intervention.

One-way Analysis of Variance (ANOVA) was used to compare differences in the mean scores of plaque and gingival indices between the three groups. A p value of ≤ 0.05 was considered to be statistically significant.

**RESULTS**

Baseline sociodemographic characteristics: A total of 615 students, including 307 females (49.9%) and 308 males (50.1%), were assigned to two groups; Intervention group comprising 304 students (49.4%) and control group comprising 311 students (50.6%). Participants drawn from urban, suburban and rural areas constituted 197 (32.0%), 198 (32.2%) and 220 (35.8%) respectively. The age of the students ranged between 11-15 years. Students aged 12 years formed the main bulk of the participants (52.20%) followed by those aged 13 years (18.54%), 11 years (17.56%), 14 years (7.48%) and 15 years (4.23%) Table (1)

<table>
<thead>
<tr>
<th>Table (1): Distribution of the study groups by gender and assignment status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
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</tbody>
</table>

* By Chi square test.
Clinical Assessment:
A-Plaque Index: Table 2 displays that at the pre-intervention assessment, the differences in the mean plaque score of the three groups (rural, suburban and urban) proved statistically significant (p=0.01) unlike comparisons at the post-intervention and follow up assessments (p= 0.17 and 0.06 respectively).

<table>
<thead>
<tr>
<th>Stage of Assessment</th>
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<th>F</th>
<th>p-value*</th>
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<tr>
<td></td>
<td>Total</td>
<td>303</td>
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<tr>
<td>Post -intervention assessment</td>
<td>Between Groups</td>
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<td>1.751</td>
<td>.175</td>
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<td></td>
<td>Within Groups</td>
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<td></td>
<td>Total</td>
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</tr>
<tr>
<td>Follow up assessment</td>
<td>Between Groups</td>
<td>2</td>
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<td>Within Groups</td>
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<td></td>
<td>Total</td>
<td>303</td>
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</tr>
</tbody>
</table>

*p ≤ 0.05 (Significant), **Based on One-way Analysis of Variance

B-Gingival Index: Table 3 shows that at the pre-intervention assessment, the differences in the mean plaque score of the three groups (rural, suburban and urban) proved statistically significant (p=0.02) unlike comparisons at the post-intervention and follow up assessments (p= 0.16 and 0.12 respectively).

<table>
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<td>Total</td>
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<tr>
<td>Post-intervention assessment</td>
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<td>1.790</td>
<td>.169</td>
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<td>Within Groups</td>
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<td></td>
<td>Total</td>
<td>303</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ 0.05 (Significant), **Based on One-way Analysis of Variance

C-Gender Differences: Females in the intervention and control groups exhibited lower mean plaque and gingival scores than males and maintained the difference for both scores at all assessment stages (p < 0.001). Table (4 &5)
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Table (4): Plaque index of the study participants comparing gender differences by assessment stage

<table>
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<tr>
<th>Stage of assessment</th>
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<th>Mean</th>
<th>SD</th>
<th>p-value*</th>
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<td>Post-intervention assessment</td>
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<td>Follow up assessment</td>
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<td>1.1300</td>
<td>.48933</td>
<td>&lt; 0.001</td>
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<td></td>
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<td>308</td>
<td>1.3436</td>
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</tr>
</tbody>
</table>

*p ≤ 0.05 (Significant), ** Based on paired student t-test

Table (5): Gingival index of the study participants comparing gender differences by assessment stage

<table>
<thead>
<tr>
<th>Stage of assessment</th>
<th>Gender</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>p-value*</th>
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</thead>
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<td>Pre-intervention assessment</td>
<td>Female</td>
<td>307</td>
<td>1.2899</td>
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<td>&lt; 0.001</td>
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<tr>
<td>Follow up assessment</td>
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<td>307</td>
<td>1.0114</td>
<td>.49478</td>
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<tr>
<td></td>
<td>Male</td>
<td>308</td>
<td>1.2201</td>
<td>.51494</td>
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</table>

*p ≤ 0.05 (Significant), **Based on paired student t-test

DISCUSSION
The current study evaluated periodontal health status, oral health behaviours, and the consequence of an educational intervention on oral hygiene and periodontium health among primary school students in Duhok Governorate, Kurdistan Region, Iraq.

The target population consisted of students aged 11 to 15, who have been chosen throughout a multi-stage random sampling procedure from a list of schools provided by the General Directorate of Education. The high response rate and low percentage of unanswered questions indicate the representativeness of the study sample and the prospect of reliable results. It is believed that the studied sample size and the inclusion of 12 different schools, drawn from an economically dissimilar region made the study sample reasonably representative of the various regions of Duhok.

The effects of health education has been studied by using two indices PI 20 and GI 21 which were used to assess the oral cleanliness, gingival health status and to provide precise evidence of relationship between the amount of plaque and gingival inflammation among the study participants. PI has been demonstrated to be an effective metric for determining the outcome of mechanical anti-plaque methods and the level of oral hygiene in educational oral health interventions in earlier researches. Numerous analyses have shown plaque as the leading etiological factor in the pathogenesis of periodontal disorders. Oral hygiene represents the quantity of plaque on teeth, thus it is reasonable to hypothesize that the prevalence and severity of periodontal diseases are inversely proportional to the extent of oral cleanliness in the population.

Plaque and gingival indices with high scores at the preintervention assessment
among the participants confirm the results of studies carried out on Iraqi school students 14, 15, 24, 25. The findings of poor oral hygiene and gingivitis are consistent with studies from other developing countries 26, 27, 28. These scores have been very highly significantly reduced for the intervention group following the health education program which is in accordance with other studies 19, 24, 29 and validates Kay and Locker's 30 observations that educational interventions aimed at reducing plaque levels and increasing dental health might be effective 31, 32, 33 and review findings 30, 34, 35. In this study, improvements in oral hygiene and periodontal health were more apparent. The students' poor oral hygiene at the beginning of the study, as well as the fact that they were undergoing an educational intervention for the first time in their lives, may have contributed to this marked improvement. However, depending on the latest findings, it implies that educational intervention can have positive short-term impacts among adolescents. Adolescents in Duhok could benefit from a school-based educational intervention to improve their dental hygiene.

The ability of the participants to maintain the improved level of plaque and gingival health at the follow up assessment after cessation of the educational program indicated that the study participants have kept on daily oral home care practice. This was in agreement with another study 24. The control group showed slight improvements in oral cleanliness and periodontal health. It has been observed that subjecting students to a dental examination and a questionnaire can promote their oral hygiene. 24, 36. Confirms the finding that clinical examination can act as motivation and stimulate the students to take home care practices, extensive improvements in the intervention groups tend to speak for the actual efficacy of the intervention in the current study. Both gingival and plaque scores in this study are consistently higher in rural than in urban communities, and appear to account for the difference in severity of periodontal disease that has been reported between rural and urban populations. Those findings in line with previous studies 37, 38. People living in urban areas had less gingivitis than those living in rural areas; these differences between urban and rural areas were attributed to differences in oral hygiene, dental care and nutritional condition. Residents of rural counties are at high risk of having poor oral health outcomes for several reasons. They are likely to be of lower socioeconomic status than those living in urban areas, which can make it very difficult to access care. Residents of rural counties are also more likely to be less educated and to have more behavioural risk factors 25, 39, 40. Females in the intervention and the control groups exhibited lower mean plaque and gingival scores than males. Generally females have been found to have a lower severity of periodontal disease, this might be attributed to that females had better oral hygiene than males 10, 15, 38. Prior to the educational program, there was poor gingival health reflecting poor dental health knowledge, attitude and home care behavior. Urban group exhibited a better gingival health status followed by suburban and rural groups. For all the three groups (rural, suburban and urban), both plaque and gingival scores showed marked reduction at two weeks post intervention, most of which
was sustained at follow up assessment. The improved performance in the intervention groups obviously demonstrates the true impact of the intervention.

Females in the intervention and control groups had significantly lower mean plaque and gingival scores than males. Those in the intervention group not only improved after the intervention as males did but at the same time maintained the difference between them.

Recommendations emphasized the importance of establishing school-based educational programs concentrating on oral self-care. The program should emphasize the immediate gains such as fresh breath, clean teeth, and attractive appearance as key aspects for motivating these adolescents. Further research is needed to evaluate the long-term benefits of the intervention. Those from low socioeconomic groups and boys should form a priority.

REFERENCES
31. Sri Wendari AH, Lambri SE, van Palenstein Helderman WH. Effectiveness of primary school-based oral health education in West Java,
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Appendix 1: Questionnaire

1. اخترت من البيانات المذكورة في الجدول التالي:
   A. نماثثين
   B. sửaويت
   C. نموذج
   D. مركبة

2. هل يمكنك توضيح ما هو السبب الرئيسي الذي يدفعك للعلم؟
   - A. تعلم للوظيفة
   - B. تعلم في العائلة
   - C. تعلم من الأصدقاء
   - D. من أجل الدراسة

3. تفضل الدراسة في هذه الجامعة بسبب:
   A. النشاطات المتنوعة
   B. التخصصات المتاحة
   C. التدريس الجيد
   D. الوضعية الجيدة

4. كيف يمكن أن تحدد مدى تقبلك للتعلم الفعلي في هذا المكان?
   A. جيد
   B. متوسط
   C. ضعيف
   D. غير قابل

5. هل تفضل التعلم الفعلي على النظرية؟
   - A. نعم
   - B. لا

6. كيف يمكن أن تحدد مدى تقبلك للتعلم الفعلي في هذا المكان؟
   - A. جيد
   - B. متوسط
   - C. ضعيف
   - D. غير قابل

7. هل تفضل التعلم الفعلي على النظرية؟
   - A. نعم
   - B. لا

8. هل تفضل التعلم الفعلي على النظرية؟
   - A. نعم
   - B. لا

9. هل تفضل التعلم الفعلي على النظرية؟
   - A. نعم
   - B. لا
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8. رمانی دهد دمین خویش زیادیان تخت دمین بالازکننا ددانا؟
   1. همودان نبی‌ن
   2. گرمینونا ددانا
   3. نوزانم

9. گیزان دن خارنی‌ن ل خوابن کارکردن‌نا خراب دنگن ل سر ددان؟
   1. هفتم و زمزمون
   2. گوشت
   3. غیر و خبرمنین و
   4. شریامن و خارنی‌ن گرای
   5. نوزانم
   6. نه
   7. نوزانم

10. بالا کردنن گرمان‌ن خوابید دنانا به‌هی‌ذ رمی؟ بهان

11. چه ریتم‌ا دخوی؟

12. تو نوزارن دنانا کارگردان ل سر;
   1. همین کارگردان
   2. بالازکنان ددانا
   3. باتشکنان ناسخان بین
   4. همین کارگردان کرمان
   5. نوزانم

13. تو کمک‌سان دنانا نوزارن ددنانا دکمک؟
   1. ل دمین بی‌بی‌دن
   2. شیوه‌مک بردودمان (6 همین)
   3. ل دمین بی‌بی‌دن و هموصا جار جارا
   4. ب چریا شیوه‌مک بردودمان (سال جارگ‌ن)
Appendix 2: Oral examination form

ID#.............................................. School..............................................................

Name..............................................................

Baseline examination:  Date:

<table>
<thead>
<tr>
<th>PI</th>
<th>7</th>
<th>6</th>
<th>5</th>
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</tbody>
</table>

Plaque Index (PI)  Gingival Index (GI)

0 = No plaque  0 = Normal gingival.
1 = Plaque is not seen by naked eye only by running the probe.  1 = Change in color, texture, no bleeding on probing.
2 = Plaque is seen by naked eye.  2 = Bleeding on probing.
3 = Abundance of plaque.  3 = Spontaneous bleeding.
HEALTH EDUCATION ROLE IN IMPROVING PERIODONTAL HEALTH

### Post intervention examination:

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پوخته

رولي روشگيریا ساختمانی دوختن ساختمانی بين ناخوشین یونیتی بو فوتاپین فوتاپینایان ل پاریزجها

پیشامک و نماینده: دانایین گامیک لیکوئیدین گزیده پیش‌بینان ناشناکا کر کو به‌حال‌فوون و گرانی ناخوشین یونیتی نافذ زاروک و سیلیمان دا دبیلن، دگل فی زی تیزی‌کی 50 تا 100% ز زاروکان ل تمسین 12 سالی نیشانین هومودانا پیشینه همه.

نامایج: نعف لیکوئیدین هته به‌جهتین یو هدف‌ساختگان رولی پروتارمی روشگیریا ساختگی دوختن ساختگی دوختن ساختگی...

به‌شماری‌و و ریزتن لیگیناتو: فکلینی نمو فوتاپی به‌میادین نمین نمین تمسین ویان دنیا 11 و 15 سالی د...

بو دست‌یافتنی توان برای دیکتا دیمگرافی توپی داشت که پیشرفته کی/پیشرفته کی هاته...

در هر تیک زوال هم‌سری گژین فوتاپینایان بین پولینکری، دوو فوتاپینه برگه‌گان هرمسکی (عووانی) هاته هم‌بارتن به پارامتری روشگیریا ساختگی، دگل هم‌وارتا هردرسی فوتاپینایان دی ویک رگمانی کونترلکن. و هوسا نمو گرودی فوتاپی نمین یک دهات ز 615 فوتاپی هاته دستانشانکن بو دست‌یافتن و کونترلکن (305 و 311 فوتاپی ل دوی نکدا).

پس‌برامک (استبان) هاته کارکینان بو دست‌یافتنی زانیاریا ل دور تامینی و جین‌برداری و ناخوشین دناداری. ل دویتپا بی‌شکینا کلینیکی بو ساختن هر فوتاپیایی/فوتاپینایی هاته کرین. کاریگیرنی روشگیریا ساختگی هاته هدف‌ساختگان داراک گیتی بانشایه دوو گاه‌نیتی یکجا ن후اری؛ بی‌پیچ‌لی پلاک و پیچ‌لی پینتین.

نامه‌مک: سخاچان نمرین بندین بی‌سیار پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی ده‌ساختگان لیکوئیدین یک د شروع‌یویونا بی‌پیچ‌لی پلاک و پینتی...

نمکین ل گرودی ندیستانی و کونترلکن، نتمین کمتری ژیوکای پلاک و پینتی هم‌سری گژین کوران نشنادان.

نمرینی همه تیک و پینتی و پلاکی دنی لیکوئیدین دا ب پس‌برداری ل دست‌یافتنی گونش‌شنیان بنی‌دری بو ز جفکین بژیرید.
الخلاصة

دور التثقيف الصحي في تحسين الوضع الصحي لامراض اللثة لدى طلبة المدارس الابتدائية في محافظة دهوك

الخلفية والأهداف: كشفت بيانات من العديد من الدراسات الووبائية أن انتشار وشدة أمراض اللثة منتشر على نطاق واسع بين الأطفال والمرأة، مع ما يقرب من 50 % إلى 100 % من الأطفال بعمر 12 سنة لديهم علامات التهاب اللثة.

الهدف: صممت هذه الدراسة لتقييم دور برنامج التثقيف الصحي في تحسين الحالة الصحية اللثوية لدى طلاب المرحلة الابتدائية في محافظة دهوك. المشاركين وطرق البحث: استقصت الدراسة طلاب تتراوح أعمارهم بين 11 و 15 سنة من مدارس حكومية في (دهوك). تم استخدام عينات عشوائية متعددة المراحل للتسجيل من مدارس حكومية

لحصول على تمثيل ديموغرافي اجتماعي أفضل، تم تصنيف المدارس عشوائيا إلى ثلاث مجموعات متساوية تمثل القطاعات الريفية، الضواحي والقطاعات الحضرية. في كل من المجموعات المدرسية الثلاث المصنفة، تم تخصيص مدرستين بشكل عشوائي لبرنامج التثقيف الصحي مع اعتبار المدرستين الأخريين بمثابة ضوابط. وقد تم تعيين ما مجموعه 615 طالب للتدخل والضوابط (304 و 311 طالبا على التوالي). تم استخدام استبيان للحصول على معلومات عن العمر والجنس والأمراض الطبية. تبع ذلك فحص أسنان سريري لكل طالب/طالبة. تم تقييم آثار التثقيف الصحي باستخدام متغيرين للتقييم وهو: مؤشر البلاك و مؤشر اللثة

النتائج: كشفت النتائج عن درجات عالية من مؤشرات البلاك واللثة في التقييم الأولي قبل التثقيف الصحي على المشاركين. تم تخفيض هذه الدرجات بشكل كبير في تقييم التدخل في مجموعات التثقيف الصحي مقارنة بمجموعات التحكم. تم الحفاظ على هذا التحسن في مجموعات التدخل في نهاية التقييم بعد ستة أسابيع من التدخل.

أظهرت الإناث في مجموعات التدخل والتحكم درجات أقل من متوسط البلاء واللثة مقارنة بالذكور. كانت درجات كل من اللثة واللويحة في هذه الدراسة أعلى باستمرار في المناطق الريفية منها في المجتمعات الحضرية (p < 0.05).