

## Studying the effectiveness of Farquhar's six-step method in motivating patients with chronic periodontitis about good oral hygiene

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**Abstract:** *The six-step method is a systematic method using as a basis namely the self-efficacy theory. The aim of the study is to determine how effective is Farquhar's six-step method for improving oral hygiene. By blind randomization study participants were divided into two groups - control group (n = 23) and intervention (n = 25). Patients from the control group were instructed for 20 min. through the traditional methods. In the intervention group the traditional instruction was applied first, and then for 10 min. Farquhar's six-step method was applied. For assessing the efficiency of the two methods, it was checked whether OHI is significantly altered in the third week. In the control group the OHI index number from 3 at the first visit was reduced to 2.535 in the third week (p = 0.032). Improvement of the oral hygiene was recorded due to instructions received. The same test was performed in the intervention group. A decrease in OHI was also recorded in patients from this group, from 2.556 to 1.516. In order to check whether Farquhar's six-step method affects this improvement to a greater extent, a difference is formed between the mean differences in the OHI index numbers of both groups. The statistical analysis shows that the mean difference in the intervention group is 1.040 (p = 0.004) and is greater than the difference in the control group 0.465. This result concludes that the improvement of oral hygiene in the intervention group, in which, in addition to the traditional methods, additional cognitive processes were used, is considerably greater and has a greater effect.*

**Key words:** *chronic periodontitis, Farquhar's model, motivation, oral hygiene*

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### I. Introduction

Different psychological models have been developed for modifying risky behaviour of patients [1-6]. In the case of oral health promotion, they are difficult to apply due to the fact that most oral diseases are not lethal. One of the most common are the self-regulation social-cognitive models. They examine the health behaviour predictors. They arise from the subjective expected utility theory of Edwards, suggesting that the behaviour is the result of rational assessment of potential downsides and benefits. The cognitive models describe the behaviour as a result of rational information processing and focus on individual cognitions. The most famous of them is the Bandura's model [3]. Bandura's social cognitive theory defines self-efficacy as a health behaviour determinant. Under personal efficacy we understand how a particular patient is able to take the necessary action to improve his/her condition. Whereas people do not believe that they can produce the required and desired result with their actions they have little incentive to act. The six-step method (Farquhar 1987; Albright and Farquhar 1992) is a systematic method using as a basis namely the self-efficacy theory. It is widely used to modify the behaviour of patients to promoting a healthy lifestyle by improving food culture, smoking cessation, etc [7].

In Bulgaria there are no data on the use of cognitive methods for improving self-efficacy observing the oral hygiene, and it is an important factor for the development, progress and outcome of treatment of chronic periodontitis, and many other oral diseases. Instructions for oral hygiene are key to maintaining periodontal health as the periodontal diseases is caused by inflammatory response in gum tissues [8-12]. It is important that the dentists not only implement adequate periodontal treatment, but is also able to motivate his/her patients to improve the effectiveness of their oral hygiene habits, because it is the only way he/she would achieve lasting results [13,14].

This imposed the conduct of a pilot study involving 48 patients with chronic periodontitis.

### **Aim**

The aim of the study is to determine how effective is Farquhar's six-step method for improving oral hygiene.

## **II. Material and methods**

The study was conducted from May to June 2015 in various dental practices in the city of Plovdiv. Before its beginning the participating dentists were instructed, trained and calibrated in the taking of periodontal indices used. Informed consent was obtained from all patients. Power analysis was used to determine the minimum number of sample. Community Periodontal Index of Treatment Needs– CPITN, was used to diagnose periodontal status, recommended by the WHO as a universal epidemiological method for the diagnosis of periodontal diseases. Periodontitis is diagnosed based on signs of inflammation, formation of periodontal pockets and bone destruction. Greene-Vermillion oral hygiene index (OHI) was applied for evaluation of the oral hygiene status, as first DI (debris index) was taken by scraping the distribution of plaque on tooth surfaces with a probe and then CI (calculus index) for the distribution of supragingival tartar.

Index numbers:

0 - No plaque

1. It is covered with plaque 1/3 of the tooth surface
2. It is covered with plaque 2/3 of the tooth surface
3. It is covered with plaque over 2/3 of the tooth surface

### **Higher index values show poorer oral hygiene.**

By blind randomization study participants were divided into two groups - control group (n = 23) and intervention (n = 25).

1. Patients from the **control group** were instructed for 20 min. through the traditional methods:
  - they were explained what are the correct movements of the brush (used is the Bass method),
  - how to clean interdental space with the help of threads and interdental brushes.

In the **intervention group** the traditional instruction was applied first, and then for 10 min. Farquhar's six-step method was applied, which includes:

**Step 1 - Placing, identification of the problem.** Achieved by asking the questions: How many times a day you brush your teeth? How much time do you spend brushing your teeth? How many times a week you do interproximal cleaning?, etc.

**Step 2 - Building trust.** Many patients are convinced that they cannot achieve change in personal care. This step aims to build trust between treating physician and patient by a more extensive interview. The medical specialist brings arguments and counterarguments aimed to bring down the barriers that the patient has raised in front of himself/herself and the change.

**Step 3 - Raising awareness about health behaviour.** The patient is advised to keep a diary of daily teeth brushing and interdental cleaning until next visit. He/She must record their feelings during brushing. The diary is used to identify internal and external precursors of behaviour that affect him/her and to identify barriers to his/her change.

**Step 4 –Preparing the action plan.** The plan must be realistic, executable, concrete. For example:

- Brush your teeth twice a day!
- Use dental thread once a day, in the evening!
- Brush your teeth for three minutes!

**Step 5 - Evaluating the plan and adjustments.**

- Positive changes in the habits of the patient is encouraged and recorded
- In case there are no changes, changes in the plan are made.

**Step 6 - Maintaining and keeping the changes.**

It is very easy to lose the acquired new health habits due to various social factors - long working day, alcohol consumption, travels, etc. The dentist and the hygienist should encourage and encourage their patients to preserve and reinforce the changes made in their behaviour.

The described procedure was repeated three times for three weeks (once a week) in both groups. During the study, patients were not given any specialized periodontal treatment.

Statistical data processing was made with SPSS v.17. Descriptive statistics was applied - Student's t-test, analysis of frequency distributions.

### III. Results and Discussion

The six-step method (Farquhar 1987; Albright and Farquhar 1992) is a systematic method using as a basis the self-efficacy theory [7]. Personally effective beliefs are formed from four main sources of information - successful achievements, indirect experience, verbal persuasion and psychological condition. Successful achievements are based on the own experience of the individual as past successes reinforce expectations while failures lower them. Indirect experience can be acquired through observations of similar successful activities. Verbal persuasion refers to activities that conjure the patients the ability to achieve certain goals and objectives. The psychological and emotional state of an individual affects his/her judgment on self-effectiveness. By using the four sources increase in the personal effectiveness can be achieved.

In this study the results show that there is no statistically significant difference in the gender distribution of the respondents in both groups (Table 1).

**Table 1.** Gender distribution of respondents

| Groups                    | Men |        |      | Women |        |       | Total |        |      |
|---------------------------|-----|--------|------|-------|--------|-------|-------|--------|------|
|                           | n   | %      | Sp   | n     | %      | Sp    | n     | %      | Sp   |
| <b>Control group</b>      | 13  | 48.14  | 9.61 | 10    | 47.62  | 10.90 | 23    | 47.92  | 7.21 |
| <b>Intervention group</b> | 14  | 51.86  | 9.61 | 11    | 52.38  | 10.90 | 25    | 52.08  | 7.21 |
| <b>All</b>                | 27  | 100.00 | -    | 21    | 100.00 |       | 48    | 100.00 | -    |

The average age in the persons covered by the sample is  $55.94 \pm 13.10$ . The severity of the chronic periodontitis is presented in Table 2.

1. The mild form has pocket depth of 4-5 mm, gingival margin is located at or near the enamel-cement border, horizontal resorption of the interdental septum 1/3 of the root length.
2. Reported as an average form is periodontitis with pocket depth of 5-6 mm., with gingival margin located near or below the enamel-cement border, exposed bifurcation, bi-digital mobility of teeth, horizontal resorption of the interdental septum 1/2 of the root length.
3. Severe periodontitis has pocket depth of 7 mm, passable furcation from end to end, vertical resorption of the septum

**Table 2.** Distribution of patients by severity of periodontitis

| Severity of periodontitis | n  | %      | Sp   |
|---------------------------|----|--------|------|
| <b>Mild form</b>          | 15 | 31.25  | 6.69 |
| <b>Average form</b>       | 25 | 52.08  | 7.21 |
| <b>Severe form</b>        | 8  | 16.67  | 5.38 |
| <b>All</b>                | 48 | 100.00 | -    |

The statistical characteristics of the two groups are presented in Table 3.

**Table 3.** Statistical characterization of the study groups

| Study groups              | n  | Mean | Standard Deviation | Standard Error of Mean |
|---------------------------|----|------|--------------------|------------------------|
| <b>Control group</b>      | 23 | 3.00 | 0.76               | 0.16                   |
| <b>Intervention group</b> | 25 | 2.56 | 1.46               | 0.29                   |

Before the beginning the study the patients in the control and the intervention group were measured and calculated the OHI (as the sum of DI and CI). By applying Student's t-test it was checked if there is a statistically significant difference in OHI index numbers obtained in both groups. The analysis established a difference of dispersions (Levene's test  $P > 0.05$ ) and this necessitated the implementation of the T-test variant in unequal dispersions. It turned out that both study groups had the same level of oral hygiene at the start of the study (first week of the visit) ( $p = 0.189$ ).

For three weeks, patients in the control group obtained the traditional instructions for oral hygiene (as described above), and patients from the intervention group, besides it, were also applied the Farquhar's six-step method. After the last visit OHI was again measured from the patients of both groups. For assessing the efficiency of the two methods, it was checked whether OHI is significantly altered in the third week (high index values represent poor oral hygiene and vice versa). For this purpose in the third week, during the last visit OHI was again measured under the method described. 1. **In the control group** (Table 4) the OHI index number from 3 at the first visit was reduced to 2.535 in the third week ( $p = 0.032$ ). Improvement of the oral hygiene was recorded due to instructions received.

**Table 4.** Changes in OHI after the third week in the control group

| OHI        | n  | Mean  | Standard Deviation | Standard Error of Mean |
|------------|----|-------|--------------------|------------------------|
| First week | 23 | 3.000 | 0.7604             | 0.1586                 |
| Third week | 23 | 2.535 | 0.6651             | 0.1387                 |

The same test was performed in the intervention group (Table 5)

**Table 5.** Changes in OHI after the third week in the intervention group

| OHI        | n  | Mean  | Standard Deviation | Standard Error of Mean |
|------------|----|-------|--------------------|------------------------|
| First week | 25 | 2.556 | 1.4583             | 0.2917                 |
| Third week | 25 | 1.516 | 1.1025             | 0.2205                 |

A decrease in OHI was also recorded in patients from this group, from 2.556 (during the first visit) to 1.516 (during the last visit). The difference is statistically significant ( $p = 0.007$ ).

The conclusion that can be drawn is that in both groups of patients after the instructions - traditional or in addition to Farquhar's six-step method, oral hygiene has been improved, i.e. the applied methods for motivation are effective.

In order to check whether Farquhar's six-step method affects this improvement to a greater extent, a difference is formed between the mean differences in the OHI index numbers of both groups (at the beginning and at the end of the treatment) (Table 6). Example: In the control group, OHI has a value of 3 on the first visit, and in the third week it is 2.535 i.e. the difference in index numbers is 0.465.

**Table 6.** Difference between the mean differences in OHI index numbers of the control and the intervention group

| Differences in values of OHI (before and after) | n  | Mean   | Standard Deviation | Standard Error of Mean |
|---|----|--------|--------------------|------------------------|
| Control group                                   | 23 | 0.4652 | 0.47636            | 0.9933                 |
| Intervention group                              | 25 | 1.0400 | 0.79373            | 0.15875                |

The statistical analysis shows that the mean difference in the intervention group is 1.040 ( $p = 0.004$ ) and is greater than the difference in the control group 0.465. This result concludes that the improvement of oral hygiene in the intervention group, in which, in addition to the traditional methods, additional cognitive processes were used, is considerably greater and has a greater effect. The result coincides with the studies of other authors [7,15,16].

Disadvantages of this study are the short observation period of patients and the low number of respondents.

#### IV. Conclusion

This study proved the effectiveness of Farquhar's six-step method for motivation. It can be successfully used in the practice as a reliable and economical method for primary prevention. Awareness and training of the dental community for its application is needed, especially bearing in mind that the method is simple and easy to implement and does not require involvement of a psychologist. Success in the prevention not only of oral diseases, but of a number of common diseases, can only be achieved by the application of innovative techniques and methods.

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