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# The Relationship between Stages of Dental Cleaning Behavior Change Based on Trans-theoretical Model (TTM) with School Role and Social Support in Students

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## *Abstract*

### *Background*

Social support and school play a pivotal role in the development of oral health-related behaviors among students. This study was conducted to determine the relationship between stages of dental cleaning behavior change based on Trans-theoretical model with school role and social support in Iranian students.

### *Materials and Methods*

In a cross-sectional study, 525 male and female students were selected through cluster and simple random sampling. Demographic information, data related to trans-theoretical model constructs and social support and school role were collected via self-reports. The obtained data were analyzed using SPSS version 16.0 software.

### *Results*

The findings showed that 58% of students (32% boys and 26% girls) used none of the dental cleaning tools. Most of the students (42.5%) were found to be in the preparation stage of dental cleaning behavior. There was a significantly direct correlation between school role and self-efficiency and perceived benefits ($P<0.05$, $r=0.159$). Also there was a significantly reverse correlation between school role and perceived barriers ($P<0.05$, $r= -0.311$,). No significant correlation was reported between social support and school role during stages of dental cleaning behavior ($P>0.05$).

### *Conclusion*

The results indicated that the majority of students did not use of dental cleaning tools and did not receive sufficient social support in this regard. To perform dental cleaning behavior, student should increase perceived self-efficacy and benefits and decrease perceived barriers. Low performance of dental cleaning behavior among students is indicative of the necessity of performing intervention programs aiming to promote dental cleaning behavior.

***Key Words:*** Oral health, School role, Social support, Students, Trans-theoretical Model.

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## 1- INTRODUCTION

Oral health is a key element of public health and one of the priorities of the World Health Organization (WHO). A normal oral functioning provides physical, mental and social welfare (1) and leads to enhanced quality of life (2-3). On the other hand, oral diseases cause sleep disorder and learning problems, slow the growth and reduce self-confidence, communications and social relations (4). Dental caries and gingival infection are among the most prevalent oral diseases (5). About 60-90% of children worldwide (6), and 79.7% in Iran suffer from dental caries (7). Despite the prevalence of dental caries and its preventability, the behaviors associated with oral health are poor (8).

The people's beliefs (9), cultural (10) and economic conditions (6), and social support (6), are the factors affecting the behaviors associated with oral health. Studies have shown that social support plays a significant role in oral health (9, 11). Lack of social support is followed by grave consequences like increased mortality, cardiovascular diseases, reduced mental health (12), and failure to establish health habits (13). Social support, as a factor influencing the health-related behaviors (14), facilitates the health promotion behaviors (15), and provides a favorable ground for cultivating healthy behaviors among the children (16).

Studies have documented the effect of environments such as school on the students' oral health (5, 11, 17-18). School is one of the most important officially organized institutions that helps the students' growth and development, mental and physical health and economic productivity (19). Through providing the required trainings for recognition of problems, schools can have a remarkable role in promoting the students' oral health (20). Adolescence, a period for learning and maintaining the health-related behaviors, is the foundation for development of health behaviors in adulthood (21). School is greatly involved in the development of habits, beliefs and health behaviors (11) as well as the oral health of adolescents (5). In spite of numerous studies carried out on the effect of school role and social support on oral health (5, 11), none has evaluated the relationship stages of dental cleaning behavior based on Trans-theoretical model with school role and social support among Iranian students.

Trans-theoretical model(TTM) is one of the behavior change models that has been used in many studies in different aspects (22, 23). This model includes behavior change constructs, self-efficacy, perceived benefits and barriers and change processes. The behavior change involves five stages including pre-contemplation (individuals have no intention of changing their behavior in the next six months), contemplation (individuals intend to change in the next six months), preparation (individuals perform the health behavior until a month later), action (individuals perform dental cleaning behavior less than six months), and maintenance (individuals carry out dental cleaning behavior regularly for more than six months).

The current study aimed to determine the relationship between stages of dental cleaning behavior based on TTM model with school role and social support in students. Measurement of social support and school role in during behavior stages enables us to better organize our activities in line with designing oral health educational interventions and to promote the oral health of students. In general, considering the high incidence of dental caries (7) and low prevalence of health behaviors among students (24), effect of social support on oral health (5, 11), the role of school in development of oral health-related behaviors among students (5), and shortage of studies on correlation of stages of dental cleaning behavior

change with social support and school role, the present study was carried out to determine the relationship between stages of dental cleaning behavior change based on TTM model with school role and social support among Iranian students.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

This cross-sectional study was conducted on the second grade high school students of Sanandaj city, Kurdistan province, Iran in 2016. Considering $\alpha=0.05$, $d=0.05$ and $p=0.5$ via the formula $n=z^2*p(1-p)/d^2$, the sample size was estimated to be 384 students. To increase accuracy of results, the sample size was estimated 525 students.

### 2-2. Methods

The study data were collected after taking permissions from Sabzevar University of Medical Sciences and education department of Sanandaj city, Kurdistan province. In the first stage, high schools of Sanandaj city were divided into two clusters, and 10 schools were selected from among 89 existing schools. In the second stage, several classes were chosen from the classes of each school through simple random sampling. Proportional to the size of each class, a proportion of students were randomly asked to complete the questionnaire.

It should be noted that in the case of few classes in a school, the samples were selected from all classes and in the case of limited number of students in each school; all students were included in the study. To perform the study, the researcher, the first author, attended the schools at 10:00 AM and distributed the questionnaires among the students after explaining the objectives of the study. The questionnaire took 12-15 minutes to complete. All students were willing to participate in the study. Prior to collecting the questionnaires, they were checked if they were completed. About 10 students had not completed the questionnaire fully, so the questionnaires were returned to be completed.

### 2-3. Measuring tools: validity and reliability

The self-efficacy construct included 10 items rated on four-point Likert scale, with cut-off point of 20, reliability of 85% and validity of 0.81; perceived barriers consisted of 10 items rated on five-point Likert scale, with cut-off point of 25, reliability of 81% and validity of 0.83; perceived benefits comprised of 8 items rated on five-point Likert scale, with cut-off point of 20, reliability of 85% and validity of 0.84 (22, 25).

The stages of change the stages of change are: pre-contemplation (not yet acknowledging that there is a problem behavior that needs to be changed), ontemplation(acknowledging that there is a problem but not yet ready or sure of wanting to make a change), preparation (getting ready to change),ƒaction(changing behavior), and maintenance (maintaining the behavior change) (26). The Kappa coefficients of the four items of dental cleaning behavior stages were found to be 0.75 for the first stage, 0.78 for the second stage, 0.45 for the third stage and 0.75 for the fourth stage.

Social support included 5 items rated on five-point Likert scale, with cut-off point of 12.5, validity of 0.8 and reliability of 0.85, and school role consisted of 4 items rated on five-point Likert scale, with cut-off point of 10, validity of 0.8 and reliability of 0.86. The social support and school role items were constructed based on the viewpoints and experiences of students in a form of a qualitative study by one of the researchers of this study, with their reliability and validity being confirmed (25). **Table.1** shows the placement of students in each stage of dental cleaning behavior change.

### 2-4. Ethical consideration

This study was approved by the research council of Sabzevar University of Medical Sciences. To take into account the ethical considerations and to protect the participants' rights, all legal procedures were taken into consideration, a written letter of introduction was presented and permission was taken from the concerned authorities, the participants qualified for the research were identified, the objectives of the study were explained to them and informed written consent was taken from them. In addition, the participants can withdraw from the study whenever they wished and their personal data were kept confidential in all stages of the study. Before data analysis, all data were anonymous and participants were identified merely by the questionnaire number.

### 2-5. Inclusion and exclusion criteria

The inclusion criteria in this study consisted of male and female students studying in the second grade high school and willingness to participate in the study. The exclusion criteria comprised of the ages less than 15 and more than 18 years. Data were collected by a two-part questionnaire. The first part included the background information (gender, age, parents' education, parents' jobs, family income, health status evaluation, and number of referrals to dentist) and the second part involved trans-theoretical model constructs, social support and school role whose validity and reliability had been confirmed by the Iranian researchers(22, 27).

### 2-6. Data Analyses

Having collected all the questionnaires, the data were extracted, entered SPSS version 21.0 software and analyzed by one-way ANOVA (determine relationship between stages of dental cleaning behavior and perceived self-efficacy, benefits, benefits, school role, and social support), Chi-square (determine relationship between stages of dental cleaning behavior, gender, parents' education, parents' job, family income) and independent t-test (determine relationship gender with perceived self-efficacy, benefits, benefits, school role, and social support) and correlation coefficient tests (determine relationship perceived self-efficacy, benefits, benefits, school role, and social support).

**Table-1:** Placement of students in each stage of dental cleaning behavior change (26)

| Questions | 1. How frequently do you clean between your teeth? | 2. How long have you been cleaning between your teeth at your current frequency? | 3. In the next 30 days, do you plan to clean between your teeth? | 4. In the next 6 months do you think you might clean between your teeth? |
|---|---|---|---|---|
| Stages | | | | |
| Pre-contemplation | < 3 times/week | | About the same or less often | About the same or less often |
| Contemplation | < 3 times/week | | | More often |
| Preparation | < 3 times/week | | More often | |
| Action | 3 or more times/week | < 6 months | | |
| Maintenance | 3 or more times/week | 6 months or more | | |

## 3- RESULTS

A total of 525 students, 280 (53.4 %) females and 245 (46.6 %) males, with the mean age of 16.91±1.9 years old participated in this descriptive-analytical study. Of them, 58% used none of the dental cleaning tools (32% boys and 26% girls), 10% used dental floss and toothbrush regularly during the day, 12% used toothbrush regularly during the day, 9% used dental floss and 11% used toothbrush irregularly. There was not a significantly direct correlation between stages of dental cleaning behavior, gender, parents' education, parents' job, and family income. The results of independent t-test showed a higher mean score for self-efficacy in males than the females (P=0.02). Family income was reported to have no statistically significant correlation with any of the study variables.

Social support was significantly correlated with frequency of referrals to dentist (P=0.02, r=0.169). There was a significant correlation between self-efficacy and oral health evaluation, so that students who evaluated their oral health as excellent had a higher self-efficacy score (P=0.04, r=0.183). The findings of Chi-square indicated a significant correlation between parents' education and stages of dental cleaning behavior change; the students who were in the action and maintenance stages of dental cleaning behavior had parents with higher education (P=0.03). **Table.2** demonstrates the frequency and percentage of students in each stage of dental cleaning behavior. Most of the students (42.5%) were in the preparation stage of dental cleaning behavior. **Table.3** shows the mean and standard deviation (SD) of trans-theoretical model, social support and school role-constructs. The mean scores of perceived benefits and self-efficacy of dental cleaning behavior increased at the final stages of the behavior, indicating a statistically significant difference. As indicated, the mean score of perceived barriers at the initial stages of behavior change is higher than those of other stages. No significant difference was observed between the mean scores of school role and social support-and stages of dental cleaning behavior.

**Table.4** presents the correlation between dental cleaning behavior determinants, social support and school role, and constructs of trans-theoretical model. The results of Pearson correlation coefficient showed a significantly direct correlation between the self-efficacy of dental cleaning behavior and perceived benefits. As shown in the **Table.4**, school role had a significantly direct correlation with self-efficacy and perceived benefits (P<0.05, r=0.463) of dental cleaning behavior-and a significantly reverse correlation with perceived barriers (P<0.05, r=-0. 248).

**Table-2:** Frequency and percentage of stages of dental cleaning behavior among high school students

| Stages of behavior change | Frequency | Percentage |
|---|---|---|
| Pre-contemplation | 68 | 12.9 |
| Contemplation | 16 | 3 |
| Preparation | 223 | 42.5 |
| Action | 101 | 19.2 |
| Maintenance | 117 | 22.3 |

**Table-3:** Mean and standard deviation of trans-theoretical model constructs, social support, and school role due to behavior change stages among high school students

| Behavior change stages | Perceived benefits | | Perceived barriers | | Perceived self-efficacy | | School role | | Social support | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Pre-contemplation | 18.76 | 6.85 | 26.76 | 6.53 | 20.31 | 7.31 | 8.51 | 3.26 | 13.61 | 3.05 |
| Contemplation | 22.87 | 6.15 | 23.47 | 7.6 | 21.06 | 7.91 | 8.5 | 2.65 | 13.63 | 3.75 |
| Preparation | 22.62 | 4.81 | 21.67 | 5.22 | 24.02 | 7.96 | 8.54 | 3.06 | 13.66 | 3.41 |
| Action | 25.03 | 4.4 | 21.91 | 4.26 | 25.58 | 8.46 | 8.54 | 3.17 | 13.76 | 3.17 |
| Maintenance | 25.36 | 4.93 | 20.41 | 4.18 | 28.13 | 8.74 | 8.53 | 2.81 | 14.81 | 3.23 |
| P-value | 0.001 | | 0.001 | | 0.001 | | 0.91 | | 0.32 | |

SD: Standard deviation.

**Table- 4:** Matrix of correlation between dental cleaning behavior determinants based on trans-theoretical model, social support and school role among high school students

| Variables | Perceived self-efficacy | Perceived barriers | Perceived benefits | Social support | School role |
|---|---|---|---|---|---|
| Perceived self-efficacy | 1 | | | | |
| Perceived barriers | -0.248* | 1 | | | |
| Perceived benefits | 0.463* | -0.137* | 1 | | |
| Social support | 0.01 | -0.02 | 0.04 | 1 | |
| School role | 0.159* | -0.311* | 0.189* | 0.02 | 1 |

*P<0.05 (two-tailed).

## 4- DISCUSSION

This study evaluated the correlation of social support and school role with stages of dental cleaning behavior change based on trans-theoretical model among the students of high schools for the first time. The results of the study showed that more than half of the students used none of the dental cleaning tools and the majority of them were in the preparation stage of dental cleaning behavior. Morowati Sharifabad et al. (2011), reported 49.6% of students were in the pre-contemplation stage and more than half of them did not use dental cleaning tools (22). Also, 60% of the patients referring to clinics (28) in the study of Tillis et al. (2003), and 69.8% of the healthcare personnel in the study of Nemat Shahrbabaki et al. (2016), were found to be in the maintenance stage of dental cleaning behavior (28). Low knowledge of students about the importance of dental cleaning tools, their ignorance of oral health, especially in childhood, motivation, low commitment and self-efficacy in performing the behavior, poor experience about oral diseases and poor understanding of the severity of these diseases, good assessment of their oral health, a sense of not suffering from oral diseases and inability to do away

with the obstacles ahead of the behavior and to comprehend its benefits could be the reasons why more than half of the students did not use dental cleaning tools and why they were located in the first three stages of behavior change. That the majority of students were located in the preparation stage of dental cleaning behavior could be because firstly, students' exposure to the questionnaire items might have highlighted the importance of behavior in their mind and have caused them to decide to perform the behavior; secondly, the significance of appearance in the studied age group might have probably drawn their attention toward maintaining and promoting their oral health and prepared them to carry out the behavior; thirdly, the incidence of some dental problems in students or peers might have been a driving factor for preparing to perform the behavior.

The results of this study showed that a significant increase in the mean scores of self-efficacy and perceived benefits and significant reduction in the mean scores of perceived barriers during the stages of dental cleaning behavior change. The findings of studies by Tavakoli and and Falahi (29), and Kamalikhah et al. (30), indicated that self-efficacy and perceived benefits of the people who were in the final stages of dental cleaning behavior were higher than the initial stages of behavior. It can be argued that there was a direct correlation between performing the behavior, perceived benefits and increasing self-efficacy. Regular practice of health behavior encourages an individual to do other related behaviors, increases the motivation and benefits of doing the behavior, helps to overcome the barriers and reinforces the person's self-efficacy again. In the present study, no significant difference was obtained for the mean score of social support during the stages of dental cleaning behavior. Moreover, studies have not investigated the correlation of this variable with stages of dental cleaning behavior. The low score of social support and lack of significance difference during the stages of behavior change could be due to the fact that first, the studied students did not receive different kinds of social support like emotional, informational, instrumental and financial support from their social groups to carry out dental cleaning behavior. When students do not receive these supports, more mental pressure will be imposed on them, barriers to behavior will be increased and behavior will be postponed consequently. Second, by measuring different kinds of social support, some kinds of social support might show significant difference during the stages of dental cleaning behavior.

Third, social support might not be necessary due to intangibility or non-severity of oral problems in the studied age group. Given the influential role of schools in maintaining and promoting oral health (31-32), mean score of school role during the stages of dental cleaning behavior was low, indicating to statistically significant difference. This could be due to lack of or inappropriate oral health-related trainings at schools, inadequate place and time for cleaning the teeth at schools, shortage of health trainers at high schools in the studied geographical area and negligence of teachers and school authorities, as significant behavioral models of students, toward oral health.

Considering the similar mean score of school role from the initial to the final stages of dental cleaning behavior, it can be inferred that the trainings presented have been poor or insufficient. The results of Pearson correlation test showed a significantly direct correlation between self-efficacy, perceived benefits and school role and a significantly reverse correlation between self-efficacy, perceived barriers and school role. Studies have documented the direct correlation of

self-efficacy with perceived benefits of oral health behaviors and inverse correlation of self-efficacy with perceived barriers (30, 33-34). Self-efficacy directly affects the health-related behaviors and other cognitive determinants. People with higher self-efficacy consider greater goals for themselves expect better outcomes and see the obstacles as challenges that can be overcome(35).Caring for the psychological characteristics of individuals like self-efficacy is an important factor in oral health and its related habits (36).

On the other hand, confidence is inherent among people who acquire it from experiences, failures, achievements and environment (37). School is one of the ideal environments for changing the behavior. School, as the most important place for transferring the health information (2), plays a crucial role in the development of health behaviors in students. By increasing the perceived benefits of dental cleaning behavior, reducing the barriers to performing the behavior and enhancing the self-efficacy, school plays a great part in the health-related behaviors. For example, the motivational interviews designed according to trans-theoretical model by the school health trainers can be an effective approach to change the oral health-related behaviors. These interviews can create trust in people, reduce their resistance against change, discover the decision-making ambiguities for behavior change and address their problems.

It should be noted that students may ask for elimination of barriers to performing dental cleaning behavior at schools through promoting the benefits of behavior like good oral smell, beautiful teeth and self-confidence. By observing the increased behavior and its perceived benefits in students, schools will proceed to supply the equipment and facilities required for performing the behavior. Therefore, it can be argued that by increasing the perceived benefits and self-efficacy and performing dental cleaning behavior, schools will take action to meet the students' needs and play a more prominent role. On the other hand, when barriers such as fatigue, impatience and unwillingness to carry out the behavior are seen in students, schools will have no intention to eliminate the existing barriers. Thus, the presence of the abovementioned obstacles will diminish the role of school in performing the behavior.

### 4-1. Limitations of the study

Although lack of evaluating students in different academic levels, cross-sectional nature of the study and lack of tracking the results over time were some of the limitations of the study, the obtained results can be helpful for the families, school health trainers, teachers, healthcare experts and specialists and dentists in order to design appropriate oral health training programs.

## 5- CONCLUSION

The results indicated that the majority of students did not use of dental cleaning tools and did not receive sufficient social support in this regard. To perform dental cleaning behavior, student should increase perceived self-efficacy and benefits and decrease perceived barriers. Low performance of dental cleaning behavior among students is indicative of the necessity of performing intervention programs aiming to promote dental cleaning behavior. Future oral health-related interventional studies based on trans-theoretical model constructs are recommended to pay a special heed to school role and type of social support in order to enhance the impact of educational interventions. Moreover, researchers are suggested to identify the reasons for the success or failure of these interventions as well as the most important social support (financial, emotional, affective and

instrumental) in dental cleaning behavior through future qualitative studies.

## 6- CONFLICT OF INTEREST

The authors had not any financial or personal relationships with other people or organizations during the study. So there was no conflict of interests in this article.

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