

# Midwifery Students Training in Oral Care of Pregnant Patients: an Interventional Study

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## Abstract

**Objective:** Midwives may play an important role in oral health promotion of pregnant women, whom they are in close contact with. Our aim was to evaluate an educational intervention on the oral health attitude and practices among the junior midwifery students of Tehran University of Medical Sciences in 2010.

**Materials and Methods:** The junior midwifery students were divided into intervention (n=29) and control (n=33) groups. The intervention group was first educated about general oral health, oral hygiene practices during pregnancy, and tooth brushing and flossing on models. Subsequently, the students performed role playing to ensure they understood the aforementioned lessons correctly. Before and three months after the training course the students filled out a validated self-administered questionnaire and a simplified plaque index was recorded. Statistical analysis was done by Mann-Whitney test and linear regression models.

**Results:** Before the intervention, the mean scores of attitude in general oral health for the intervention and control groups were 5.8 and 5.4, respectively, which improved to 8.9 and 5.4 after the intervention (P<0.001). The mean score of oral health attitude in pregnancy was 20.4 in the intervention group and increased to 30.9 (P<0.001). The intervention group demonstrated much better oral health practices in pregnancy and lower plaque index score after the intervention.

**Conclusion:** The promising finding about attitude and practice improvement in midwifery students after participating in a short course on oral health promotion in pregnancy shows the necessity to enrich their training program by including this subject.

**Key words:** Oral health, Attitude, Practice, Midwifery, Pregnant women

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## INTRODUCTION

Pregnant women go through substantial physiological changes during pregnancy. Among them, changes in oral cavity may lead to increased susceptibility to dental caries, periodontitis, xerostomia, and dental erosion, due to frequent vomiting during pregnancy [1]. Periodontal infections have been considered as a risk factor for pre-term birth, low birth

weight, infant mortality or growth delay [2]. Pathogenic bacteria involved in the inflammation of periodontal tissues can decrease the blood supply of the placenta [3]. The oral health practices of pregnant women can enormously affect the oral health of their children [4]. Behavioural factors such as irregular or no dental visits, poor oral hygiene, and high frequency of sweets consumption,

which cause poor maternal oral health, are considered to play important role in the future oral health of their children [5, 6].

Cariogenic bacteria in mothers' mouth have been demonstrated to have a positive correlation with occurrence and severity of early childhood caries in their children. Dental caries can be controlled if parents start dental care of their infants as soon as tooth eruption begins in their oral cavity. Biannual visits are highly recommended until the age three. Parents are responsible for taking care of their infants' teeth by brushing two times daily, using a smear of fluoridated toothpaste [5, 6].

Many studies have shown that pregnant women mostly have a negative attitude towards the importance of oral health care and dental treatment during pregnancy [7- 10]. Oral health professionals may utilize the pregnancy period as an opportunity to improve oral health of future mothers, and consequently promote the oral health of their children.

Maintaining oral health in pregnancy is very important. Because pregnant women have regular health check-ups before, during, and after pregnancy, health providers such as midwives have a great opportunity to provide appropriate oral health instructions [11, 12]. Oral health promotion via educational programs may help decrease non-desirable changes in pregnant women's mouths and improve their quality of life. Therefore, oral health should be integrated into health promoting strategies, especially in countries with less-developed public dental care [13].

Training midwifery students may improve oral health behaviour in pregnant women. Their curriculum is not currently containing enough oral health related training. Midwives should receive appropriate training in order to improve pregnant women's oral health. The aim of the current study was to evaluate the effect of an educational intervention on the oral health attitude and practices among the junior midwifery students of Tehran University of Medical Sciences in 2010.

## **MATERIALS AND METHODS**

### ***Study population***

A convenient sampling method was used to include all available midwifery students of Tehran University of Medical Sciences in this interventional study. These students were attending two separate campuses. These two groups were randomly selected as the intervention (n=29) and control group (n=33). The response rate was 93% and 91% respectively.

### ***Intervention***

Initially a booklet regarding oral health care was given to the students in the intervention group, followed by a two-hour lecture, based on PowerPoint presentations about oral health in general, and during pregnancy, the correct method of tooth brushing and flossing, using tell, show, do model by the university instructors of the Community Oral Health Department at the School of Dentistry. After the lecture, two volunteer students performed selected pre-designed role-play scenarios and others were asked to discuss and criticize different aspects of oral health during pregnancy demonstrated by the scenarios. Immediately before, and three months after the interventional course, the students were asked to fill out a self-administered validated questionnaire regarding their attitudes and practices about oral health care in non-pregnant and pregnant women. Other questions examined different aspects of oral health care. An oral examination was performed on all students and the simplified plaque index (PI-S) was recorded before and after the intervention as a proxy indicator for their own general oral health behaviour.

### ***Pilot study***

As the questionnaire was produced by combining two different, previously validated questionnaires, the validity of its content was evaluated qualitatively, and confirmed by university educators in the Community Oral Health Department.

In this regards two questions underwent minor modifications.

The reliability of the questionnaire was assessed during a test–retest procedure in a sample of 10, second year midwifery students over a one-week interval. The minimum agreement coefficient was 0.7. A senior dental student was educated to record the plaque index (PI) of three students, with the agreement coefficient of 0.9 in test-retest examinations.

### **Measurement tool**

A validated self-administered instrument was used in this study [14, 15], which was composed of the following segments: demographic information (age, marital, and socio-economic status), general oral health attitude (lifelong tooth protection, prevention methods), attitude regarding the oral health of pregnant women (dental treatment during pregnancy, importance of oral health care before pregnancy, midwife–dentist cooperation, midwives’ oral health knowledge, midwives’ role in oral health promotion, midwives’ need for oral health information) and oral health practices during pregnancy (oral examination, questions and counselling about oral health care, referral to a dentist).

A five-point Likert scale, ranging from completely agree to completely disagree, was used to evaluate the midwives’ attitudes. The maximum values for oral health attitude in general, oral health attitude, and practices during pregnancy variables were 10, 35 and three respectively.

### **Plaque index**

For assessing the PI, we chose the buccal surfaces of teeth number 16, 11, 26, 31, and the lingual surfaces of the teeth number 36 and 46, as indicators. An explorer and a dental mirror were used in proper daylight to examine each tooth surface after drying. The cervical third of the indicator teeth surfaces was visually examined using an explorer to detect any remaining plaque.

The possible scores were 0, which meant no plaque present, one, which indicated plaque present on one-third of the tooth surface or less, two, which indicated plaque on one-third to two-thirds of the tooth surface, and three, which indicated accumulation of debris on more than two-thirds of the tooth surface [16].

### **Statistical analysis**

Statistical analysis was conducted by performing Mann-Whitney U test and linear regression modeling when appropriate, using SPSS version 16 software (Microsoft, IL, USA).

### **Ethical considerations**

The study protocol was approved by the Ethics Committee of Tehran University of Medical Sciences. All students entered a code instead of their names in the questionnaires in order to protect their privacy.

## **RESULTS**

The mean age of the participants was 21.75 years (range 21–24) in the intervention group and 21.40 years (range 19–25) in the control group. Of the students, 90% and 79% reported their economic status as very good or good, and 45% and 29% reported their fathers having university level education in the intervention and control groups, respectively. No significant difference was detected in demographic factors between the two groups (Table 1). Before the intervention, almost half of the students believed that their teeth would be preserved to the end of their lives. Most of the students thought that all pregnant women must have proper oral care as a part of their general health care before pregnancy.

Almost 100% of the students in both groups agreed that midwives need to receive appropriate oral health care education during their training.

Tables 2 and 3 show the students’ attitudes regarding general oral health and oral health during pregnancy by comparing related questions before and after the intervention.

**Table 1.** Demographic information of midwifery students in the intervention and control groups

Background factor		Intervention n= 22	Control n= 24
Mean age (years)		21.75	21.40
Marital status	Married	1(5)	7(29)
	Single	21(95)	17(71)
Self-reported SES	Very good	2 (9)	2 (9)
	Good	18 (82)	17(74)
	Poor	2 (9)	4 (17)
	Very poor	0 (0)	0(0)
Father's educational level	Illiterate	0 (0)	3 (13)
	Semi-illiterate	0 (0)	2 (8)
	Primary school	2 (8)	7(29)
	Middle school	3 (14)	4 (18)
	High school diploma	7 (32)	1 (4)
	College education	0 (0)	1 (4)
	Associate degree	4 (18)	2 (8)
	Bachelor's degree	3 (14)	2 (8)
	Master's degree	0 (0)	1 (4)
	Doctorate degree and higher	3 (14)	1 (4)
Mother's educational level	Illiterate	0 (0)	4 (17)
	Semiliterate	0 (0)	3(13)
	Primary school	2 (9)	9 (38)
	Middle school	5 (23)	2 (8)
	High school diploma	10 (46)	0(0)
	College school	0 (0)	1 (4)
	Associate degree	4 (18)	2 (8)
	Bachelor's degree	0 (0)	2 (8)
	Master's degree	1 (4)	0(0)
	Doctorate degree and higher	0 (0)	1 (4)
Place of residence	Owned property	20(91)	17 (71)
	Rental house	2 (9)	6 (25)
	Free of charge	0 (0)	1 (4)
Living in dormitory	Yes	5 (23)	8 (33)
	No	17 (77)	16 (67)

The mean scores in general oral health attitudes were 5.8 and 5.4 for the intervention and control groups, respectively, before the intervention. These changed to 8.9 and 5.4 afterwards (Table 4). The mean scores in the attitude about oral health during pregnancy were 20.4 and 19.3 for the intervention and control groups, respectively, which increased to 30.9 and 23.4 after the intervention. The mean PI-S scores were 1.1 and 1.2 in the intervention and control groups before the intervention, which were changed to 0.4 and 1 after that, respectively. The groups showed no differences in the mean scores of attitude, practice, and PI-S at baseline.

The scores for oral health practice during pregnancy based on oral examination were 42.1 and 31.8 for the intervention and control groups, respectively, before the intervention and 100 and 62.5, after the intervention ( $P=0.002$ ). The other two oral health practice questions, oral health care counselling and referral to a dentist, also improved after the intervention.

Table 5 shows the students' oral health practices in pregnancy by related questions before and after the intervention.

Using regression modeling to assess the effect of demographic factors on the students' attitude and practice changes, no significant difference was detected between the two groups ( $P > 0.05$ ).

## DISCUSSION

This study evaluated the effect of an educational intervention on oral health attitudes and practices among the midwifery students. Our findings showed that students' oral health attitudes and practices significantly improved three months after undergoing the intervention.

It was encouraging to find that students' PI, as an indicator of oral health, decreased due to the intervention effect.

The World Health Organization has highly recommended that oral health should be integrated into comprehensive general health-promoting strategies and practices [17].

**Table 2.** Attitude of midwifery students in the intervention and control groups towards general oral health

Attitude	Before the intervention		After the intervention		p	
	Intervention n= 19	Control n= 22	Intervention n= 22	Control n= 24		
I think that my own teeth will be preserved to the end of my life. (I will never need a denture)	Completely agree	2 (10.5)	3 (13.6)	11(50)	4 (16.7)	0.00
	Agree	7 (36.8)	9 (40.9)	11(50)	9 (37.5)	
	Disagree	6(31.6)	6 (27.3)	0 (0.0)	8 (33.3)	
	Completely disagree	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)	
	Don't know	3 (15.8)	4 (18.2)	0 (0.0)	3 (12.5)	
I do not think we can do much to prevent dental problems.	Completely agree	0 (0.0)	1 (4.5)	0 (0.0)	1 (4.2)	0.00
	Agree	0 (0.0)	3 (13.6)	0 (0.0)	13 (54.2)	
	Disagree	13 (68.4)	14 (63.8)	0 (0.0)	6 (25)	
	Completely disagree	4 (21.1)	3 (13.6)	22 (100)	1 (4.2)	
	Don't know	2 (10.5)	1 (4.5)	0 (0.0)	3 (12.5)	

**Table 3.** Attitude of midwifery students in the intervention and control groups towards oral health in pregnant women

Attitude about oral health in pregnant women		Before the intervention		After the intervention		P value
		Intervention n= 19	Control n= 21	Intervention n=22	Control n=24	
There is no reason for the dentists not to treat a pregnant woman.	Completely agree	4 (21.1)	2 (10)	21 (95.5)	6 (25)	0.00
	Agree	8 (42.1)	12 (60)	1 (4.5)	16(66.7)	
	Disagree	4 (21.1)	4 (20)	0 (0.0)	1(4.2)	
	Completely disagree	1 (5.3)	1 (5)	0 (0.0)	0 (0.0)	
	Don't know	2 (10.5)	1 (5)	0 (0.0)	1(4.2)	
All pregnant women must have oral care as a part of their general health care before pregnancy.	Completely agree	7 (36.8)	5 (23.8)	22 (100)	8(33.3)	0.00
	Agree	11 (57.9)	13 (61.9)	0 (0.0)	16(66.7)	
	Disagree	1 (5.3)	2 (9.5)	0 (0.0)	0 (0.0)	
	Completely disagree	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Don't know	0 (0.0)	1 (4.8)	0 (0.0)	0 (0.0)	
Midwives and dentists can cooperate well for dental treatments of pregnant women during pregnancy	Completely agree	9 (47.4)	8 (31.8)	22 (100)	10(41.7)	0.00
	Agree	9 (47.4)	12 (57.1)	0 (0.0)	14(58.3)	
	Disagree	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Completely disagree	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Don't know	1 (5.3)	1 (4.8)	0 (0.0)	0 (0.0)	
I think pregnant women have a good knowledge of the importance of oral health care	Completely agree	1 (5.3)	2 (9.5)	2 (9.1)	2(8.3)	0.02
	Agree	1 (5.3)	5 (23.8)	0 (0.0)	2(8.3)	
	Disagree	10 (52.6)	10 (47.6)	5 (22.7)	16(66.7)	
	Completely disagree	7 (36.8)	2 (9.5)	15 (68.2)	4(16.7)	
	Don't know	0 (0.0)	2 (9.5)	0 (0.0)	0 (0.0)	
I think midwifery students have adequate knowledge of oral health.	Completely agree	2 (10.5)	1 (4.5)	0 (0.0)	2(8.3)	0.00
	Agree	6 (31.6)	7 (31.8)	1 (4.5)	10(41.7)	
	Disagree	10 (52.6)	12 (54.5)	2 (9.1)	9(37.9)	
	Completely disagree	1 (5.3)	1 (4.5)	19 (86.4)	3(12.5)	
	Don't know	0 (0.0)	1 (4.5)	0 (0.0)	0 (0.0)	
Midwives play an essential role in oral health promotion of pregnant women	Completely agree	4 (21.1)	6 (27.3)	22 (100)	7(29.2)	0.00
	Agree	14 (73.7)	13 (59.1)	0 (0.0)	14(58.3)	
	Disagree	1 (5.3)	0 (0.0)	0 (0.0)	1(4.2)	
	Completely disagree	0 (0.0)	2 (9.1)	0 (0.0)	1(4.2)	
	Don't know	0 (0.0)	1 (4.5)	0 (0.0)	1(4.2)	
Midwives must acquire oral health care information	Completely agree	12 (63.2)	7 (31.8)	22 (100)	7(29.2)	0.00
	Agree	7 (36.8)	13 (59.1)	0 (0.0)	15(62.5)	
	Disagree	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Completely disagree	0 (0.0)	2 (9.1)	21 (95.5)	0 (0.0)	
	Don't know	0 (0.0)	0 (0.0)	1 (4.5)	2(8.3)	

This calls for multi-professional collaboration and, oral health promotion is required within health care practices of different health professionals [13]. Comprehensive approaches to promote oral health care by public health systems are imperative in order to tackle this problem.

In the current study, oral health attitude was evaluated in two parts: the attitude towards oral health in general, and the attitude regarding oral health in pregnant women. The results were unsatisfactory in both parts at the baseline. The only positive attitude demonstrated by most participants was that pregnant women should be referred to a dentist before pregnancy for a dental check-up, in order to be safe. This is in line with the finding about the American midwives in the study by Strafford et al. [18], and in contrast to the study by Zanata et al. [19] who reported that the Brazilian midwives thought that pregnant women should be referred only when they have an obvious dental problem. We found a similar non-desirable baseline level about oral health practice during pregnancy. One third of the study population implemented oral examination and even less provided counselling to pregnant women. The students' practices were very much similar to what was reported by Zanata et al. in Brazil [19] but not as proper as what happens in many developed countries [20].

The mean PI-S scores were 1.1 and 1.2 in the intervention and control groups, respectively before initiation of the intervention, indicating a moderate to low level of oral hygiene among the students. This finding is in line with results from a study by Al-Ansari et al. [21] and in contrast to a study by Munoz et al., reporting desirable oral health behaviours in students [20]. After the intervention, a significant difference was observed regarding general oral health in the intervention group. Simplified plaque index, as a proxy index for personal oral care practice improvement, was also better in the intervention, compared to the control group, which was in line with the findings of

Kullberg et al. [22]. This finding was similar to what was reported by Park et al. in 2011 [23]. These findings indicate that providing simple oral care tips and skills such as correct methods of tooth brushing, and flossing can significantly improve oral health.

Different methods of education have often focused on a certain domains of learning including knowledge, attitude, or practice. Choosing a combination of teacher-oriented methods and student-oriented ones may mostly focus on the attitude change, and seems to be the potential reason for the success of the intervention in the current study.

In a study conducted by Skelton et al. [24] the implemented educational intervention took a longer time (16 hours) compared to that in the current study (two hours). This will have an effect on the depth and range of knowledge, attitude and practices covered. Silk et al. [25] utilized the same study method but in addition included educational courses performing group discussions. The role-playing method, which was used in the current study, was proven to be more attractive to the target groups [22]. This might be the reason for the positive outcomes of our study.

According to the Ottawa charter [26], plaque removal and demonstrating correct tooth brushing methods were effective to improve the students' personal skills. Most students and professionals even in medical disciplines are not well aware of the standard recommended oral self-care, or they may have received only minor didactic training on the subject. Effective practical learning may help to optimize the desirable outcome anticipated by health professionals such as midwives.

One of the strengths of the current study was that, at baseline, intervention and control groups were not different in demographic factors, oral health attitudes, and practices. As a matter of fact, in the national midwifery curriculum, no items were included about oral health in general and oral health care during pregnancy.

The measurement tool was designed using validated questionnaires, but its validity and reliability were tested again. All the questionnaires were coded and did not include students' personal information, which improved the validity of the answers and decreased the possibility for errors. Assessment of PI was performed by an educated dental student who was blinded to group allocation.

This study was an educational trial with a control group, which is the most powerful study design and midwifery students were randomly divided into the intervention and control groups. In the current study, baseline characteristics of the two groups, sex and age, attitude and practice scores, were found not to be different. There are also some limitations to this study. The first is in relation with the sample population, which was drawn from a single midwifery faculty. However, midwifery curriculum is similar in all midwifery faculties in Iran and Tehran University of Medical Sciences is the premier university throughout the country.

## CONCLUSION

In conclusion, adequate oral health training courses are valuable in order to improve the knowledge, attitude, and practice of the midwifery students who are in a unique position to provide appropriate consultation to pregnant women to improve the oral health of expectant mothers, which will subsequently have a great impact on the oral health care of their infants.

## REFERENCES

- 1- Mills LW, Moses DT. Oral health during pregnancy. *MCN Am J Matern Child Nurs.* 2002 Sep-Oct;27(5):275-80; quiz 281.
- 2- Dasanayake AP, Gennaro S, Hendricks-Muñoz KD, Chhun N. Maternal periodontal disease, pregnancy, and neonatal outcomes. *MCN Am J Matern Child Nurs.* 2008 Jan-Feb;33(1):45-9.

- 3- Han YW, Redline RW, Li M, Yin L, Hill GB, McCormick TS. *Fusobacterium nucleatum* induces premature and term stillbirths in pregnant mice: implication of oral bacteria in preterm birth. *Infect Immun.* 2004 Apr;72(4):2272-9.

- 4- Mohebbi SZ, Virtanen JI, Murto H, Vahid-Golpayegani M, Vehkalahti MM. Mothers as facilitators of oral hygiene in early childhood. *Int J Paediatr Dent.* 2008 Jan;18(1):48-55.

- 5- Marinho VCC, Higgins JPT, Sheiham A, Logan S. Fluoride toothpastes for preventing dental caries in children and adolescents (Review). *Cochrane Database Syst Rev.* 2003;(1):CD002278.

- 6- Adair PM1, Pine CM, Burnside G, Nicoll AD, Gillett A, Anwar S, et al. Familial and cultural perceptions and beliefs of oral hygiene and dietary practices among ethnically and socio-economically diverse groups. *Community Dent Health.* 2004 Mar;21(1 Suppl):102-11.

- 7- Bates SB, Riedy CA. Changing knowledge and beliefs through an oral health pregnancy message. *J Public Health Dent.* 2012 Spring;72(2):104-11. doi: 10.1111/j.1752-7325.2011.00289.x. Epub 2011 Oct 20.

- 8- Boggess KA, Urlaub DM, Moos MK, Polinkovsky M, El-Khorazaty J, Lorenz C. Knowledge and beliefs regarding oral health among pregnant women. *J Am Dent Assoc.* 2011 Nov;142(11):1275-82.

- 9- Hashim R. Self-reported oral health, oral hygiene habits and dental service utilization among pregnant women in United Arab Emirates. *Int J Dent Hyg.* 2012 May;10(2):142-6. doi: 10.1111/j.1601-5037.2011.00531.x. Epub 2011 Oct 31.

- 10- Martínez-Beneyto Y, Vera-Delgado MV, Pérez L, Maurandi A. Self-reported oral health and hygiene habits, dental decay, and periodontal condition among pregnant European women. *Int J Gynaecol Obstet.* 2011 Jul;114(1):18-22. doi:

- 10.1016/j.ijgo.2011.03.003. Epub 2011 May 6.
- 11- George A, Johnson M, Duff M, Ajwani S, Bhole S, Blinkhorn A, et al. Midwives and oral health care during pregnancy: perceptions of pregnant women in south-western Sydney, Australia. *J Clin Nurs.* 2012 Apr;21(7-8):1087-96. doi: 10.1111/j.1365-2702.2011.03870.x. Epub 2011 Oct 18.
- 12- Lachat MF, Solnik AL, Nana AD, Citron TL. Periodontal disease in pregnancy: review of the evidence and prevention strategies. *J Perinat Neonatal Nurs.* 2011 Oct-Dec;25(4):312-9. doi: 10.1097/JPN.0b013e31821072e4.
- 13- Rabiei S, Mohebbi SZ, Patja K, Virtanen JI. Physicians' knowledge of and adherence to improving oral health. *BMC Public Health.* 2012 Oct 9;12:855. doi: 10.1186/1471-2458-12-855.
- 14- Nair MK; Renjit M; Siju KE; Leena ML; George B, Kumar GS. Effectiveness of a community oral health awareness program. *Indian Pediatr.* 2009 Jan;46 Suppl:s86-90.
- 15- Reda A Abdel-fattah. Oral care for pregnant women. South Florida institute for post graduate health education work book. 2010.
- 16- World Health Organization (WHO). Oral health surveys: Basic methods. 4th ed. Geneva: WHO 1997.
- 17- Petersen PE. The world oral health report 2003. Geneva: WHO 2003.
- 18- Strafford KE, Shellhaas C, Hade EM. Provider and patient perceptions about dental care during pregnancy. *J Matern Fetal Neonatal Med.* 2008 Jan;21(1):63-71. doi: 10.1080/14767050701796681.
- 19- Zanata RL, Fernandes KB, Navarro PS. Prenatal dental care: evaluation of professional knowledge of obstetricians and dentists in the cities of Londrina/PR and Bauru/SP, Brazil 2004. *J Appl Oral Sci.* 2008 May-Jun;16(3):194-200.
- 20- Munoz N, Touger-Decker R, Byham-Gray L, Maillet JO. Effect of an oral health assessment education program on nurses' knowledge and patient care practices in skilled nursing facilities. *Spec Care Dentist.* 2009 Jul-Aug;29(4):179-85. doi: 10.1111/j.1754-4505.2009.00084.x.
- 21- Al-Ansari J, Honkala E, Honkala S. Oral health knowledge and behavior among male health sciences college students in Kuwait. *BMC Oral Health.* 2003 May 7;3(1):2.
- 22- Kullberg E, Forsell M, Wedel P, Sjögren P, Johansson O, Herbst B, et al. Dental hygiene education for nursing staff. *Geriatr Nurs.* 2009 Sep-Oct;30(5):329-33. doi: 10.1016/j.gerinurse.2009.06.009. Epub 2009 Aug 13.
- 23- Park MS, Choi-Kwon S. [The effects of oral care education on caregivers' knowledge, attitude, & behavior toward oral hygiene for elderly residents in a nursing home]. *J Korean Acad Nurs.* 2011 Oct;41(5):684-93. doi: 10.4040/jkan.2011.41.5.684.
- 24- Skelton J, Smith TA, Betz WT, Heaton LJ, Lillich TT. Improving the oral health knowledge of osteopathic medical students. *J Dent Educ.* 2002 Nov;66(11):1289-96.
- 25- Silk H, O'Grady Stille S, Baldor R, Joseph E. Implementation of STFM's "Smiles for Life" oral health curriculum in a medical school interclerkship. *Fam Med.* 2009 Jul-Aug;41(7):487-91.
- 26- Daly B, Watt RG, Batchelor P, Treasure ET. *Essential Dental Public Health.* Oxford: Oxford University Press 2002. pp: 47-61, 153-166.