Original Research Paper

University J Dent Scie 2023; Vol. 9, Issue 2

Oral health Literacy status among practicing Gynaecologists related to Expectant mothers and Newborns – An Interventional study

Abstract:

Aims and Objectives: An Interventional study was designed to assess knowledge, attitude, and practices of gynaecologists practicing in Faridabad regarding Oral health care in expectant mothers and newborns.

Materials and Methods: They were assessed using a 32 item validated self-administered questionnaire including demographic information and questions about knowledge, attitude and practice.

Results: Data analysis was conducted using SPSS software (version 21) and Chi-square, 103 gynaecologists participated in the study and showed significant results with P value less than .05. Oral health manual was distributed among the gynaecologists, questionnaire was refilled and reassessment was done. It showed highly statistically significant results with p value = .0065. has shown improvement of their KAP score from 65.1750 to 81.6643.

Conclusion: Thus it can be concluded that a comprehensive oral health program with the hand in hand of gynaecologists and dental specialist, is possible and has the potential to establish attitudes about the importance of maintaining optimum oral health of expectant mothers.

Key-words: Expectant mothers, multiprofessional approach, newborn, oral Health manual.

Introduction:

The most crucial and delicate phase of women's life is giving birth to the newborn. General health and well-being of expectant mother is essential during prenatal, perinatal, and postnatal period to restore good health in newborn.[1]

Perinatal oral health plays a crucial role in overall health and well-being of pregnant women and their new-born child.[2] Many women do not seek dental care during their pregnancy. Pregnancy is the distinctive time in woman's life and is characterized by complex physiological changes in the body, which bring noticeable variations in the oral cavity as well. It includes pregnancy gingivitis, benign gingival lesions, tooth mobility, dental erosion, dental caries, and periodontitis.[3]

Mothers play the most important role in overall development of child, in which oral health is also an integral part. Thus, oral health counselling becomes important for the expectant mothers.[4] Pregnancy is the best time to instill appropriate oral hygiene practices in expectant mothers which will also help in maintaining oral health in upcoming newborn. In 1976, Nowak reported that parental exposure in prenatal counselling provides an excellent opportunity, for both parents, to establish their own oral health practice.[5,6]

Access this article online

Website: www.ujds.in

Quick Response Code

DOI: https://doi.org/10.21276//ujds.2023.9.2.9

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Received : 25 Dec., 2022, **Published :** 30 June, 2023

How to cite this article: Lakhanpal, P. (2023). Oral health Literacy status among practicing Gynaecologists related to Expectant mothers and newborns – An Interventional study. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 9(2). 52 - 60

Development of a tooth begins in sixth week of intrauterine life, after which it undergoes various phases of tooth development, till it erupts in oral cavity. Inappropriate maternal diet can lead to variations in amniotic fluid composition which can further influence the activation of taste buds in newborn, thus affecting future food choices of the child. Any disturbance in mother's health during this phase may directly affect the health of a newborn.[7]

The mouth of the children which acts as a "window" to the rest of the body provides signals of general health disorders.[9] In view of female reproductive hormonal influences, pregnant women are more susceptible to periodontal disease. A few studies have verified that periodontal disease may be associated with adverse pregnancy outcomes such as premature birth and low birth weight infant.[8]

Dental caries and periodontal health status are the most common oral health issues and should be diagnosed and treated in expectant mother as they can adversely affect the pregnancy. Relationship of maternal periodontal disease with preterm delivery and low-birth weight babies has been established. Dental caries causing bacteria, Streptococcus mutans, is transmitted from mother to child by vertical transmission.[1]

The expectant mothers mostly do not have access to oral health care despite of having poor oral hygiene. Basic approach is to treat the destruction rather than prevention of disease which is due to the neglect of oral health care.[9] The recommended guidelines put more emphasis on early professional intervention and primary preventive strategies for oral health, which are the essential public health priority.[4]

Most of the antenatal clinics do not have a routine procedure for oral health screening. There are no standard guidelines as a part of prenatal care to refer pregnant women to specialized dental professionals for screening and dental treatment. Gynaecologists refer expectant mothers to dental professionals only when they present any dental complaint.[7] Oral diseases are often neglected because of lack of awareness. This negligence is due to lack of implementation not only by patients but also by primary healthcare providers such as pediatricians, gynaecologists, and general practitioners. Pregnancy is the period in which oral health care should be addressed by multi-professional approach and incorporated into comprehensive health-promoting strategies.[1]

Gynaecologists are the first ones among primary healthcare providers involved in the assessment of women throughout their pregnancy so they are important to initiate oral health program along with dentists. Gynaecologists can lend a helping hand to overcome the perceived barriers for an oral checkup such as long waiting hours, distance, and negative attitude of health professionals. Their knowledge, attitude, and practices regarding oral health care of expectant mothers and newborns are essential to increase awareness. Due to limited studies reported, this study is designed to assess knowledge, attitude, and practices of gynaecologists practicing in Faridabad regarding Oral health care in expectant mothers and newborns.

Materials and Methods:

AnInterventional study was carried out to assess the Knowledge, Attitude and Practices among Gynaecologists regarding oral health of expectant mothers and Newborns in Faridabad.

Data was collected from the Gynaecologists using a self-administered closed ended prestructured questionnaire.

After the first assessment from the questionnaire, a reassessment was done by repeating the study after 1 month among the same target population. Results of both the assessments were compared and statistically analyzed.

List of the registered practicing Gynaecologists was taken from the website (https://imaindia.org/branch/haryana/member-directory.php).[10] Clinic/Hospital address along with phone numbers was also obtained and a planned visit was made to their clinics/hospitals for questionnaire drop, pick up and manual distribution.

All the Gynaecologists practicing in Faridabad were included in the study. An estimated number of registered Gynaecologists practicing in Faridabad are around 118.

Ethical clearance was obtained from the Institutional Ethical committee.

Prior to the onset of the study, the purpose of the study was informed and explained to all the gynaecologists. An informed consent was obtained from the Gynaecologists to participate in the present study.

- All the target population was included in the study due to the following reasons -

- To Avoid Selection Bias in the available sample size
- To get Accurate results (No predictions)
- Due to uncommon variations in age group
- Considering the estimated confidence level of 95% and less marginal error, it is suggested to include the whole target population.

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

N = population size e = Margin of error (percentage in decimal form) z = z-score

The above mentioned statistical formula was used to calculate the sample size for the present study, which guided us to include all the Gynaecologists of all age groups in government and private practices in Faridabad.

Armamentarium included a face shield, N95 mask, sanitizer and self administered closed ended prestructured questionnaire with informed consent question in the beginning. A manual explaining the guidelines to be followed regarding oral health in expectant mothers and infants which was distributed to all the participating Gynaecologists upon receiving the filled questionnaires.

The questionnaire was prepared with the help of dentists and was pilot tested with 10 Gynaecologists for item clarity. Prior to study, questionnaire was pre-tested and validated with the help of experts' panel. Reliability analysis showed cronbach's alpha value of 0.858 which proves the high reliability of the questionnaire. The questionnaire was validated for construct & content validity, reliability and ease of use. Content and construct validity (0.81)showed no significant changes. Questionnaire showed high degree (0.89) of agreement during test-retest of questionnaire.

The questionnaire consisted of 32 questions, which was divided in four parts:

(1) Demographic details;

(2) Knowledge about changes in oral health during pregnancy & importance of oral health in Newborns

(3) Attitudes towards oral health care during pregnancy and in Newborns

(4) Questions related to their own practice behavior towards oral health in expectant mothers and Newborns.

Health Education Module:

Oral Health manual was distributed to all the participants in the study. This manual contains all the guidelines which any practitioner should follow to maintain oral health in pregnant females and Newborns.

Readministration of the Questionnaire:

One month after the Oral health manual distribution, the previously used self administered closed ended questionnaire was redistributed to all the same target population of the gynaecologists. All the participants were requested to refill the questionnaire so that the effectiveness of the oral health manual could be assessed for their knowledge, attitude and practice regarding the oral health care among expectant mothers and newborns.

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Categorical variables (like age, gender) were summarized as frequencies while continuous variables were summarized as Mean & Standard deviation. Graphs were prepared on SPSS version 21.Frequency distributions and chi-square tests were used. Pearson's correlation coefficients were used to calculate and assess the relationship between Gynaecologists experience and knowledge, and also between their knowledge and practice behaviors relating to oral health care among expecting mothers and newborns.ANOVA, Paired T test and Independent T test were used to compare the results of the first and second round of questionnaire study in the same target population of gynaecologists.

Results:

Table 1

Variable	Category	Number	Percentage
Age	Less than 30	1	1
	21-30	32	31.1
	31-40	44	42.7
	41-50	14	13.6
	51-60	8	7.8
	61 and above	4	3.9
Gender	Male	4	3.9
	Female	99	96.1
Practicing Experience	Less than 10	11	10.7
	11-20	56	54.4
	21-30	17	16.5
	31-40	13	12.6
	41 and above	6	5.8
Type of Practice	Government	11	10.7
	Private	92	81.3

Table 1 summarizes and gives a detailed information regarding the demographic characteristics of the study population which includes age, gender, practicing experience and the type of practice. Total number of participating gynaecologists were 103.

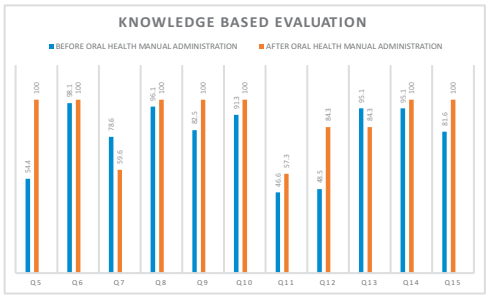
TABLE 2		Yes answer in percentage according to the age groups							
	QUESTIONS	Less than 30	31-40	41-50	51-60	61-70	Above 70	Total	p
5	Patient who is planning to get pregnant should be referred to the dentist before pregnancy.	0(0)	11(10.7)	27(26.2)	12(11.7)	5(4.9)	1(1)	56(54.4)	**.013**
6	Good control of oral hygiene during pregnancy is essential for pregnant women.	1(1)	32(31.1)	42(40.8)	14(13.6)	8(7.8)	4(3.9)	101(98.1)	.741
7	Pregnant women should be advised to delay dental treatments until delivery.	1(1)	22(21.4)	39(37.9)	12(11.9)	5(4.9)	2(1.9)	81(78.6)	.137
8	Health care practices (brushing teeth or mouthwashes) are necessary after morning nausea and vomiting.	1(1)	32(31.1)	42(40.8)	13(12.6)	7(6.8)	4(3.9)	99(96.1)	.618
9	Scaling and plaque control before pregnancy reduces gingivitis during pregnancy?	1(1)	28(27.2)	38(36.9)	12(11.7)	4(3.9)	2(2.9)	85(82.5)	.072
10	Pregnancy can cause gum bleeding, periodontal problems, tooth decay.	1(1%)	28(27.2%)	39(36.9%)	14(11.7%)	8(3.9%)	4(1.9%)	94(91.3%)	.618
11	Oral diseases can cause increased blood pressure during pregnancy.	0(0%)	14(13.6%)	18(17.5%)	10(9.7%)	4(3.9%)	2(1.9%)	48(46.6%)	.407
12	Periodontal diseases can cause low birth weight of the child.	1(0%)	31(17.5%)	41(18.4%)	14(7.8%)	7(2.9%)	3(1.9%)	98(95.1%)	.697
13	Can certain drug create oral side effects in fetus when taken during pregnancy?	1(1%)	32(31.1%)	42(40.8%)	14(13.6%)	8(7.8%)	4(3.9%)	101(98.1%)	.200
14	Does mother's nutrition have a role in baby's oral health?	1(1%)	30(21.4%)	34(37.9%)	13(11.7)	3(4.9%)	3(1.9%)	84(81.6%)	.008
15	Do you know about Natal and neonatal teeth?	1(1%)	16(31.1%)	18(40.8%)	11(12.6%)	7(6.8%)	3(3.9%)	56(54.4%)	.037
16	Taking dental radiography in the second trimester with a lead apron is permitted	1(1%)	18(17.5%)	20(19.4%)	10(9.7%)	6(5.8%)	2(1.9%)	57(55.3%)	.378
17	Dental procedures are safe in which trimester First Second Third	 0(0%) 1(1%) 0(0%)	 1(1%) 19(18.4%) 12(11.7%)	 2(1.9%) 31(30.1%) 11(10.7%)	 0(0%) 14(13.6%) 0(0%)	 0(0%) 8(7.8%) 0(0%)	 0(0%) 2(1.9%) 2(1.9%)	 3(2.9%) 75(72.8%) 25(24.3%)	.190
18	The use of dental anesthetic containing lidocaine and epinephrine is permitted during pregnancy	1(1%)	19(18.4%)	28(27.2%)	13(12.6)	8(7.8%)	4(3.9%)	73(70.9%)	**.038**
19	In the second trimester, can we do all the dental procedures?	1(1%)	15(14.6%)	16(15.5%)	8(7.8%)	2(1.9%)	2(1.9%)	44(42.7%)	.467
20	Do you think that the first oral examination of the child should be before 1 year?	1(1%)	26(25.2%)	33(32%)	11(10.7%)	3(2.9%)	3(2.9%)	77(74.8%)	.217
21	Do you think that maternal oral health will affect infant oral health?	1(1%)	22(21.4%)	30(29.1%)	11(10.7%)	3(2.9%)	2(1.9%)	69(67%)	.406
22	Do you think that infant oral hygiene maintenance advice is needed for mother?	1(1%)	32(31.1%)	43(41.7%)	14(13.6%)	8(7.8%)	4(3.9%)	102(99%)	.929
23	Do you think that dental caries can be transmitted from the mother to the child?	1(1%)	15(14.6%)	20(19.4%)	9(8.7%)	2(1.9%)	2(1.9%)	49(47.6%)	.493
24	Do you think that high caries incidence in the mother will lead to the child having higher caries risk?	1(1%)	19(18.4%)	26(25.2%)	11(10.7%)	3(2.9%)	3(2.9%)	63(61.2%)	.447
25	Do you think that will breast/bottle feeding at night time cause dental caries in children?	1(1%)	30(29.1%)	37(35.9%)	14(13.6%)	5(4.9%)	2(1.9%)	89(86.4%)	**.029**
26	Do you recommend fluoride therapy to pregnant women?	0(0%)	4(3.9%)	7(6.8%)	5(4.9%)	1(1%)	1(1%)	18(17.5%)	.499
27	When you find any suspicious clinical dental symptoms, do you refer the patient to the dentist or you prescribe medications on your own and observe?	1(1%)	30(29.1%)	42(40.8%)	14(13.6%)	8(7.8%)	4(3.9%)	99(96.1%)	.898
28	I refer patients to the dentist for dental check at the beginning of pregnancy	0(0%)	8(7.8%)	12(11.7%)	6(5.8%)	3(2.9%)	2(1.9%)	31(30.1%)	.694
29	I look for early symptoms of inflammation in the patient's mouth in their visits	0(0%)	7(6.8%)	11(10.7%)	6(5.8%)	2(1.9%)	2(1.9%)	28(27.2%)	.587
30	I take dental history of my pregnant female patients during their visits.	0(0%)	7(6.8%)	13(12.6%)	6(5.8%)	2(1.9%)	2(1.9%)	30(29.1%)	.636
31	Should the infant be referred to the dentist if he/she has natal/neonatal teeth present in the oral cavity?	1(0%)	32(31.1%)	44(43.6%)	13(12.9%)	8(7.9%)	3(3%)	101(98.1%)	**.011**
32	Do you ask the mother about her infant's oral health and oral hygiene practices during their visits?	0(0%)	8(7.8%)	8(7.8%)	6(5.8%)	2(1.9%)	2(1.9%)	26(25.2%)	.404

Table 2 shows the frequency distribution of the answers as yes (correct answer)by the gynaecologists according to the age groups. Q5, Q18, Q25, Q31 showed significant results. P value less than .05 were considered significant. Significant results depict that most of the gynaecologists are answering correctly the respective questions which depict their knowledge regarding oral health care

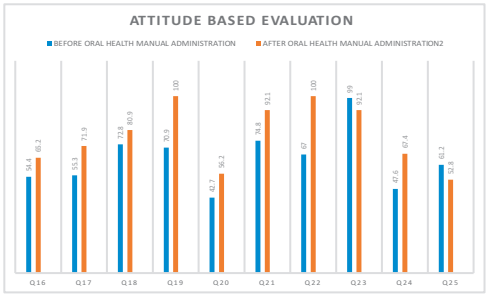
TABLE 3		Yes answer in percentage according to the practicing experience						
	QUESTIONS	Less than 10	11-20	21-30	31-40	Above 41	Total	p
5	Patient who is planning to get pregnant should be referred to the dentist before pregnancy.	5(4.8%)	26(25.2%)	12(11.6%)	11(10.6%)	2(1.9%)	56(54.3%)	.051
6	Good control of oral hygiene during pregnancy is essential for pregnant women.	11(10.6%)	54(52.4%)	17(16.5%)	13(12.6%)	6(5.8%)	101(98%)	.789
7	Pregnant women should be advised to delay dental treatments until delivery.	8(7.6%)	46(44.6%)	15(14.5%)	10(9.7%)	2(1.9%)	81(78.6%)	.063
8	Health care practices (brushing teeth or mouthwashes) are necessary after morning nausea and vomiting.	11(10.6%)	55(53.3%)	15(14.5%)	12(11.6%)	6(5.8%)	99(96.1%)	.322
9	Scaling and plaque control before pregnancy reduces gingivitis during pregnancy?	10(9.7%)	47(45.6%)	17(16.5%)	6(5.8%)	5(4.8%)	85(82.5%)	**.003**
10	Pregnancy can cause gum bleeding, periodontal problems, tooth decay.	11(10.6%)	47(45.6%)	17(16.5%)	13(12.6%)	6(5.8%)	94(91.2%)	.082
11	Oral diseases can cause increased blood pressure during pregnancy.	3(2.9%)	26(25.2%)	6(5.8%)	8(7.7%)	5(4.8%)	48(46.6%)	.139
12	Periodontal diseases can cause low birth weight of the child.	4(3.8%)	29(28.1%)	7(6.7%)	5(4.8%)	5(4.8%)	50(48.5%)	.320
13	Can certain drug create oral side effects in fetus when taken during pregnancy?	11(10.6%)	53(51.4%)	17(16.5%)	12(11.6%)	5(4.8%)	98(95.1%)	.478
14	Does mother's nutrition have a role in baby's oral health?	10(9.7%)	46(44.6%)	15(14.5%)	7(6.7%)	6(5.8%)	84(81.5%)	.057
15	Do you know about Natal and neonatal teeth?	6(5.8%)	25(24.2%)	8(7.7%)	13(12.6%)	4(3.8%)	56(54.3%)	**.008**
16	Taking dental radiography in the second trimester with a lead apron is permitted	7(6.7%)	27(26.2%)	8(7.7%)	11(10.6%)	4(3.8%)	57(55.3%)	.150
17	Dental procedures are safe in which trimester First Second Third	 0(0%) 9(8.7%) 2(1.9%)	 3(2.9%) 35(33.9%) 18(17.4%)	 0(0%) 14(13.5%) 3(2.9%)	 0(0%) 12(11.6%) 1(1%)	 0(0%) 5(4.8%) 1(1%)	 3(2.9%) 75(72.8%) 25(24.2%)	.437
18	The use of dental anesthetic containing lidocaine and epinephrine is permitted during pregnancy	8(7.7%)	34(33%)	12(11.6%)	13(12.6%)	6(5.8%)	73(70.8%)	**.031**
19	In the second trimester, can we do all the dental procedures?	6(5.8%)	20(19.4%)	9(8.7%)	7(6.7%)	2(1.9%)	44(42.7%)	.501
20	Do you think that the first oral examination of the child should be before 1 year?	8(7.7%)	43(417%)	15(14.6%)	6(5.8%)	5(4.8%)	77(74.7%)	.105
21	Do you think that maternal oral health will affect infant oral health?	8(7.7%)	38(36.9%)	13(12.6%)	5(4.8%)	5(4.8%)	69(66.9%)	.172
22	Do you think that infant oral hygiene maintenance advice is needed for mother?	11(106%)	55(53.4%)	17(16.5%)	13(12.6%)	6(5.8%)	102(99%)	.932
23	Do you think that dental caries can be transmitted from the mother to the child?	4(3.8%)	26(25.2%)	10(9.7%)	5(4.8%)	4(3.8%)	49(47.5%)	.599
24	Do you think that high caries incidence in the mother will lead to the child having higher caries risk?	7(6.7%)	32(31%)	11(10.6%)	9(8.7%)	4(3.8%)	63(61.1%)	.920
25	Do you think that will breast/bottle feeding at night time cause dental caries in children?	9(8.7%)	52(50.9%)	14(13.6%)	9(8.7%)	5(4.8%)	89(86.4%)	.220
26	Do you recommend fluoride therapy to pregnant women?	2(1.9%)	6(5.8%)	6(5.8%)	2(1.9%)	2(1.9%)	18(17.5%)	.158
27	When you find any suspicious clinical dental symptoms, do you refer the patient to the dentist or you prescribe medications on your own and observe?	11(10.6%)	52(505%)	17(16.5%)	13(12.6%)	6(5.8%)	99(96.1%)	.479
28	I refer patients to the dentist for dental check at the beginning of pregnancy	4(3.8%)	11(10.6%)	7(5.8%)	6(5.8%)	3(2.9%)	31(30%)	.145
29	I look for early symptoms of inflammation in the patient's mouth in their visits	3(2.9%)	12(11.6%)	5(4.8%)	4(3.8%)	4(3.8%)	28(27.1%)	.215
30	I take dental history of my pregnant female patients during their visits.	5(4.8%)	12(11.6%)	5(4.8%)	4(3.8%)	4(3.8%)	30(29.1%)	.129
31	Should the infant be referred to the dentist if he/she has natal/neonatal teeth present in the oral cavity?	11(10.6%)	56(54.4%)	16(15.5%)	12(11.6%)	6(5.8%)	101(98%)	.278
32	Do you ask the mother about her infant's oral health and oral hygiene practices during their visits?	3(2.9%)	10(9.7%)	5(4.8%)	4(3.8%)	4(3.8%)	26(25.2%)	.113

Table 3 shows the frequency distribution of the answers as yes by the gynaecologists according to the practicing experience. Q9, Q15, Q18 showed significant results. P value less than .05 were considered significant. Significant results depict that most of the gynaecologists are answering correctly the respective questions which depict their way of practice regarding oral health care for their pregnant patients.

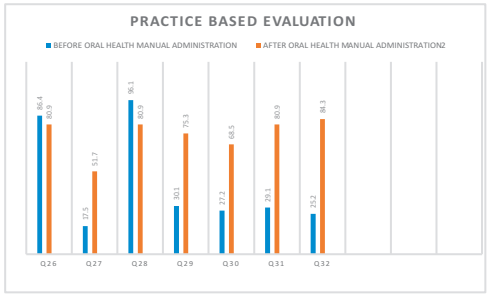
Post Oral health manual distribution assessment of the knowledge, attitude and practice among Gynaecologists regarding Oral health care in Expectant mothers and Newborns



Graph 1: This graph 1 shows the comparison of the correct answers of knowledge-based questions. This was done to assess the improvement in the knowledge of gynaecologists post oral health manual distribution. It shows a significant increase in the knowledge as the percentage of the correct answers has increased in most of the questions except **Q7 and Q13** which reflects confusion among gynaecologists regarding the correct decision for their patients.



Graph 2:this graph 2 shows the comparison of the correct answers of attitude-based questions. This was done to assess the improvement in the attitude of gynaecologists post oral health manual distribution. It shows a significant increase in the knowledge as the percentage of the correct answers has increased in most of the questions except **Q23 and Q25** which reflects confusion among gynaecologists regarding the correct decision for their patients and the need of implementation of the other way of educating the gynaecologists.



Graph 3: This graph 3 shows the comparison of the correct answers of practice-based questions. This was done to assess the improvement in the application of knowledge in their practice post oral health manual distribution. It shows a significant increase in the application of knowledge in their practice as the percentage of the correct answers has increased in most of the questions except **Q26 and Q28** which reflects confusion among gynaecologists regarding the correct decision for their patients and the need of implementation of the other way of educating the gynaecologists.

Comparison of Mean (%) of correct answers pre and post oral health manual distribution

TABLE 4	Mean	Std error of Mean
Correct answer -Mean (%) before OHM administration	65.1750	4.82989
Correct answer -Mean (%) after OHM administration	81.6643	3.15188
Chi square test	.0065 (The result is significant at p<.05)	

This table 4 shows the chi square test result of the comparison of the mean percentage of the correct answers pre and post Oral health manual distribution. It shows highly statistically significant results with **p value = .0065**. It shows that the gynaecologistshas shown improvement of their KAP score from 65.1750 to 81.6643.

Discussion:

Gynaecologists are one of the most important health care professionals involved in the appraisal and treatment of women throughout their lifespan. With increasing links between oral and general health problems, it is essential for them to acknowledge the impact of dental caries, periodontal diseases and its associated risk factors on women's overall health, as well as her child's oral health when he/she is born. This will facilitate appropriate decisions regarding timely and effective intervention for the oral health. Hence, primary and primordial preventive approaches towards oral health, for both mother and child are important during pregnancy. This can be done by organized efforts of both dental practitioners and gynaecologists. Very few studies are reported among gynaecologists in this geographic domain and require more research. Our study was to assess knowledge, attitude and practices regarding oral health care in expectant mothers and newborns. Second aim was to assess the improvement in the knowledge, attitude and practice post distribution of oral health manual and pamphlets among practicing participants.

Infant oral health care can be defined as foundation on which a lifetime of preventive education and dental care can be built up in order to help acquire optimal oral health into child and adulthood.[13] The allied health professionals as well as various community organizations must be involved for achieving this goal as the dental awareness of medical practitioners specially

gynaecologists many a times will be inadequate regarding the knowledge of the dental diseases, oral hygiene practices as well as various specialty treatment which is rendered by the dentist.

Demographic details:

Most of the participating gynaecologists in our study were females (96%) and only 4% males which is in accordance with study conducted by George et al 2016[11], Shah D 2017[14], Lyu J 2021[12]. More than 50% of the gynaecologists i.e. 54.5% had practicing experience of between 11 to 20 years.

Most of the participants (42.7%) were from the 41-50 age group. 54.4 % of the gynaecologists had practicing experience of 11 to 20 years. Only 10.7% of the participants had government job and rest of the majority were private practitioners.

First round of questionnaire fill up:

Only 54.4% of the gynaecologists think that the patient who is planning to get pregnant should be referred to the dentist before pregnancy; which is a good initiative for good oral health care and less oral health complications during pregnancy. This is a good knowledge score regarding dental referral before planning pregnancy and can be improved. This is in accordance with previously done research by Peter J (2020)[16]. Studies conducted by Shenoy et al (2009)[15] reveals that about 62% of the gynaecologists referred their patients to dentists which was little higher referral than the present study. Another study by Rocha *et al* (2011)[17] presented a situation in which the highest percentage of Obstetricians refer their patients to other professionals is when they are concerned with their oral health status(88.2%).

Periodontitis is considered a threat issue for preterm LBW outcomes, due to increase in inflammatory markers in periodontitis. In 1996, Offenbacher et al[18] stated that periodontal disease was found to be a risk factor for premature delivery and low birth weight, with expectant mothers with periodontal disease at greater risk (seven times) to deliver a preterm or low birth weight.

Jeffcoat *et al. in2001[*19] found a 4-time rise in the odds of preterm birth before 37 weeks of gestation, rising to a seven-fold increase before 32 weeks of gestation in expectant mothers with generalized or severe periodontal disease. On contrary, Moore *et al. in 2004*[20] found no association between preterm birth, low birth weight, and periodontal disease, although a link between indicators of poor periodontal health and late miscarriage were mentioned in the study.

55% of the gynaecologists in the study conducted by Shenoy et al. in 2013[15] agreed that periodontal disease in expectant mothers may lead to preterm low birth weight babies whereas, in the present study 48.5% of the gynaecologists were aware of the fact because most of the studies showed a direct relationship between periodontal disease and adverse pregnancy such as preterm birth, preterm pre-labor rupture of membranes, pre-eclampsia and post-cesarean endometritis (Crowther CA et al. 2005)[21]. Preterm birth and low birth weight are the significant causes for neonatal morbidity and mortality.[22,23] In a review, McDougall et al. in 2011[22] summarized that it is impossible to draw definite conclusions in this area, even though some studies have reported positive associations between maternal poorer periodontal status and adverse pregnancy outcomes, specially preterm birth, low birth weight and preeclampsia.[18] Gynaecologists with 21-30 years of experience had better knowledge than the other group. This can be due to combination of experience and knowledge by continued learning process towards oral health during gynaecologist care.

In the present study 94% of respondents said that pregnancy increases the tendency for swelling and bleeding from the gingival tissue but it is a well known fact that most of the gynaecologist do not look into the mouth of the pregnant women due to lack of training [Wender EH et al.1992[24], Cunningham G et al. 2000[25] and because busy Obstetricians have no time to look into patients mouth unless patients have complained about this change [Singh S et al .2011[26], Varun S et al. 2014[27]. In the present study only 27.2% of gynaecologist look for early symptoms of inflammation in the patient's mouth and 29.1% take dental history of my pregnant female patients during their visits. Rocha et al (2011)[17] surveyed and found out that more than 90% of Obstetricians expected these changes during pregnancy. When it came to putting their knowledge into practice, only 27.2% and 29.1% of the participants look for oral problems and take dental history respectively during antenatal period.

Regarding pregnancy guidelines, it was strongly suggested to include dental visits as an integral part of antenatal checkups [Patil et al.2013[28]. The introduction of mandatory dental examinations for women in an early stage of pregnancy should provoke dentists to introduce a new approach of preventive services which result in closer cooperation with

gynaecologists in order to reduce the prevalence of delivery of pre-term low birth weight babies [Stupak A et al. 2013][29]. Professionals involved in prenatal care should discuss the importance of oral heath with pregnant women and refer patients to dental treatment when necessary [Al-Habasneh et al.2008][30]. In the present study 27.2% of gynaecologists carried out oral health examination of their patients. This is in near accordance with the study done by Patil et al[28] and Shah HG et al[5] who observed that about 39% of Obstetricians performed oral examination of expectant mothers during the first trimester and 65% recommended every 6 months interval.

It has been seen that dental treatment can be provided at any time during pregnancy (Wasylco et al.1998[31], American dental association.1999[13], Lee at al.1999[32] but due to the morning sickness felt by most pregnant women during the first trimester and great chance of risk of postural hypotension during the third trimester, second trimester of pregnancy is the ideal period of doing efficient dental care[33]. In the present study 72.8% opined that dental treatment can be delivered during second trimester of pregnancy which shows a good awareness regarding dental treatment during pregnancy.

In the present study 87.9% gynaecologists were aware of the side effect of gum/periodontal disease which does not concur with the results of the study conducted by Subramanium (2008).[35] On the contrary, awareness regarding the side effect of drugs used during pregnancy was almost similar. 17.5% of the gynaecologists in our study recommended fluoride which was in accordance to the findings of the study of Subramanium (2008).[35]

74.8% of the gynaecologist think that the first oral examination of the child should be before 1 year, 67% think that maternal oral health will affect infant oral health and 61.2% think that high caries incidence in the mother will lead to the child having higher caries risk. It appears from this study that gynaecologists understood how oral health of the mother is important during pregnancy. But only 25.2% ask the mother about her infant's oral health and oral hygiene practices during their visits. This may be due to lack of training and busy schedule of their practice.

Infant oral health-care advice should be given to expectant mothers and most gynaecologists (99%) agreed on this although they are unclear that dental caries in the mother can be transmitted to their child.[36]

There were certain questions regarding infant oral health for gynaecologists. This was rarely assessed in any of the previous studies. Most of the (86.4%) gynaecologists agreed that night time feeding has a greater caries risk in infants. Further, they also thought that the mother having a higher risk of caries will lead to the child having higher risk (61.2%). Most (74.8%) of the gynaecologists also added that the first dental visit to a dentist should be before 1 year of age of the child, which is in line with the American Academy of Pediatric Dentistry specifications.[13] The above results lies in accordance with the study done by Acharya S 2018.[4]

This study also established the fact that gynaecologists are the primary health-care providers to impart proper knowledge on oral health of both the mother and the infant during and after the term of pregnancy. Increasing the role of gynaecologists in providing oral health care can play an important role in improving the dental health of expectant mothers as well as infants. This is particularly important in developing countries with semiurban and rural populations, where access to professional dental care is poor. The emphasis should be on preventionwhich is better than cure.

Second round of questionnaire fill up:

The present study shows that more than half (65.17%) of the participating gynaecologists had adequate knowledge on oral health care. Although previous studies reported that gynaecologists had adequate knowledge about oral health during pregnancy, most of the gynaecologists did not apply their knowledge in their practice.[17,37,38] Suri et al., 2015 reported that only 40% of the gynaecologists included in the study advised routine dental visits during pregnancy and only 47% advised their patients about maintaining oral hygiene during pregnancy.[27] Wilder et al. in 2007 reported that up to 49% of the practicing OB/GYNs rarely or never recommended a dental examination for their pregnant patients.[37]

In the present study, while the knowledge and beliefs of the participating residents were evaluated before the oral health manual distribution and one month after that questionnaire was repeated among gynaecologist to assess the improvement in their knowledge.

After the second round of questionnaire fill up, by the gynaecologists has showed a significant improvement in their knowledge. The mean % of the correct answers has increased from 65.17 to 81.66%. Results proved to be highly significant

with p value of .0065. If an oral health manual can improvise the knowledge, attitude and the practical implication of the oral health care in their patients, then adding a basic oral health examination and the required oral health knowledge in their study curriculum can prove to be more helpful and fruitful. Though the gynaecologists have shown significant improvement in their KAP score significantly i.efrom 65.1750 to 81.6643, but due to less sample size results should not be generalised for the entire gynaecologist population of the country. Randomised control trial should be carried out on a large scale as the concern for which the study was carried out is the need of the hour today and must be addressed.

Limitation of the study:

The major shortcoming of the study is the restriction of the study population to a specific area i.e. Faridabad. Hence the results of the study should be generalized with caution. Therefore further randomised controlled clinical trails should be carried out in future. Some of the gynaecologists refrained from the study due to lack of time, interest or conflict with their busy schedule.

Conclusion:

The results of the present study found that, most of the gynaecologists are having good knowledge on maternal and infant oral health but still there were few areas like use of fluoride therapy of pregnant women, transmission of caries causing bacteria from mother to child, which needs to be addressed.

A comprehensive oral health program with the hand in hand of gynaecologists and dental specialist, is possible and has the potential to establish attitudes about the importance of maintaining optimum oral health of expectant mothers. A multidisciplinary team that include the family physician, gynaecologists and dental practitioner should assume an active role in providing health education to pregnant women which can significantly decrease the possibility of oral diseases and related adverse pregnancy outcomes.

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