IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)
ISSN (P): 2347-4580; ISSN (E): 2321-8851
Vol. 5, Issue 9, Sep 2017, 15-34

EFFECT OF DENTAL CARE INFORMATION SUPPORT ON LEVEL OF ORAL HEALTH KNOWLEDGE, PRACTICE AND GINGIVAL CONDITION DURING PREGNANCY

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ABSTRACT

Background: Good oral health during pregnancy can not only improve the quality of life of the pregnant mother, but also potentially reduce complications during pregnancy **Aim:** This study aims to evaluate the effect of dental care information support on the level of oral health knowledge, practice, and gingival condition during pregnancy. **Subjects and Methods**: Quasi-experimental (pre-post-test) research design was utilized in this study. A purposive sample of 100 pregnant women was recruited in this study based on certain inclusion criteria. Two groups 50 each, a study group who received dental care information, support and control groups who received the routine care from two MCH centers at El- Fayoum Governorate were randomly assigned. Seven tools were used to collect the needed data. **The results**: Findings of this study reveal that no statistical significant differences were found between the two groups regarding to demographic characteristics (p = > 0.05). Improvement in mean knowledge score among study group of 35.52 ± 9.08 to 57.94 ± 4.87 (pre-post-test) with a highly statistically significant difference (p = 0.00). Moreover, improvements in the mean practice score from 6.66 ± 4.05 of pre-test for 20.78 ± 2.13. Post-test ((p = 0.000,). Also, the mean of bleeding on probing (BOP) decreased since 11.27 ± 3.22 to 4.38±1.69 as well as, the mean plaque index (PI) decreased since 85.49 ± 9.5 to 47.02 ± 9.09 respectively as indicators of improvement in gingival conditions. In **conclusion** providing information support for pregnant women about oral health care improvement their knowledge and practice as well as improvement in the degree of gingival inflammation associated with pregnancy. Integration of oral health screening through routine antenatal check-up and developing programs to educate mothers about the importance of oral and dental health care during and before planning for pregnancy were needed.

KEYWORDS: Oral Health Knowledge, Practice, Pregnancy, Dental Care, Information Support

INTRODUCTION

Pregnancy is a unique period during a woman's life and is characterized by complex physiological changes, which may adversely affect oral health and in turn can affect pregnancy outcomes. These changes

will lead to oral diseases if enough and timely care of the oral cavity is not taken (Ramamurthy & Irfana, 2017). Periodontal disease is classified according to its severity into two stages: gingivitis, a mild and reversible form which characterized by inflammation of the soft tissues surrounding a tooth without tissue damage; and periodontitis, a more advanced and severe form which characterized by destruction of supporting tissues around the teeth and bone loss (Han, 2011). The onset of gingivitis associated with pregnancy beginning with the second or third month of pregnancy and increases in severity throughout the duration of pregnancy (Steinberg Hilton, Iida & Samelson 2013; and Chawla et al., 2017). Moreover, gingival inflammation associated with pregnancy has been initiated by dental plaque and exacerbated by endogenous steroid hormones (Usin, Tabares, Parodi & Sembaj 2013). The true prevalence of gingivitis during pregnancy varies among different studies from 30% to 100%. (Al-Rayyan, Masarwa, Barakat, Momani, & Khudair 2013).

Women with periodontal disease are at 7.5 time's greater risk of a preterm birth compared to those who are not. Several studies have suggested an association n between periodontal disease and adverse pregnancy outcomes, including preterm delivery or low birth weight, gestational diabetes, preeclampsia, small for gestational age (SGA) with higher risk of perinatal and neonatal mortalities, still-birth and miscarriage (Vogt, Sallum, Cecatti, & Morais, 2010).

In Egypt, a study conducted by Edessy, El-Darwish, Nasr, Mustafa, & Ahmed (2014) to evaluate the relationship between periodontal diseases and adverse pregnancy outcomes in Bani Mazar - El Minia -Egypt, the study findings reveals that a significant relationship between periodontal disease and adverse pregnancy outcomes such as preterm labor and low birth weight (12.7% vs. 5.3% and 6.7%, respectively). Similar findings were reported by (Marakoglu, Gursoy, Marakoglu, Cakmak, & Ataoglu, 2008; Babalola, & Omole, 2010; Nasr, Mustafa, Nasr, Ali, & Alktatny, 2012). Pregnant women's knowledge and awareness regarding oral health care during pregnancy was found poor as reported by (Gambhir, Nirola, Gupta, Sekhon and Anand 2015), as most of the study sample were unaware of the potential consequences of neglecting oral hygiene during pregnancy.

Bashiru, & Anthony (2014) conducted a study to assess oral health awareness and experience among pregnant women attending antenatal clinic at the University of Port Harcourt Teaching Hospital, Nigeria, the study findings found that less than 10% of the pregnant women were aware about the effect of pregnancy on oral health and the impact of oral disease on pregnancy outcome, and only 27.9% of the study sample had visited the dental clinic during pregnancy. Moreover, Nogueira et al., (2016) assess pregnant women's knowledge on oral hygiene practices and maintenance of the baby's oral cavity, the study findings reveals that (80.95%) of pregnant women did not attend the dental clinic during pregnancy.

Additionally, Moawed, Hawsawi, AlAhmed, Al-Atawi, &Awadien (2014) assess knowledge, and oral health, self-care practices among Saudi pregnant women, the results shows that women with lower income and education had a lower knowledge score on general oral health care, and lower dental check-up attendance during pregnancy. Also, most pregnant women do not receive information about oral health and the importance of dental care prior to and during pregnancy (Detman et al., 2010). Moreover, lack of oral health advice from prenatal care providers during antenatal follow-up as they fear of the effect of x-ray or dental

procedures or medications on fetal well-being, so, they delay any intervention until the mothers delivered (Chacko et al., 2013). Moreover, oral health practices among pregnant women were found unacceptable as reported by El-Mahdi Ibrahim, Mudawi. & Ghandour (2016) as they found that 66% of the study sample had bad oral practices, and they recommended that oral health knowledge and practice needs to be enhanced and oral health prevention programs should be developed for pregnant women.

Oral health promotion via educational programs can help to 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 promotion during pregnancy, including Egypt **(**Rabiei, Mohebbi, Patja & Virtanen 2012). Moreover, most pregnant women need more information about oral health, and prevention of gingival and periodontal diseases as they are more concern about general health and less aware about dental health during pregnancy (Ramamurthy & Irfana 2017). Nurses play a crucial role to promote oral health care for pregnant women through assessment of maternal dentition as a routine prenatal practice, referring all women to visit their oral health care professional for dental care, educating, and counseling on proper brushing and flossing techniques, as well as, encourage good oral hygiene practice (Brahmankar, 2013).

Although most researches has focused on establishing the relationship between periodontitis and adverse pregnancy outcomes. However, virtually no studies have investigated what knowledge pregnant women have about oral health and what proper practice they follow during pregnancy and their effects on gingival condition, So, the aim of the current study was to evaluate the effect of oral health information support on knowledge, practice, and gingival condition among pregnant women with gingivitis.

SIGNIFICANCE OF THE PROBLEM

Unawareness of dental care importance is one of the factors challenging dental services during pregnancy **(**Lee, Milgrom, Huebner & Conrad, 2010**).** Also, Pregnancy is a time for women to become more aware about their health habits and is more likely to adopt a healthy lifestyle. Therefore, health promotion efforts may be most beneficial by providing information on oral health care to pregnant women. Also, providing oral health information and care to pregnant women may have other benefits to their fetuses as well as, if the women adopt healthy habits can teach their children about the benefits of proper oral health care. (Villa, Abati, Strohmenger, Cargnel & Cetin 2011).

This study will help in the development of guidelines related to oral health care for pregnant women to facilitate the transfer of information between the dentists and nurses working in prenatal clinics. So, pregnant women can benefit from these guidelines. In addition, this study can improve the nursing practice through integrating oral/ dental health care, hygiene in nursing curricula to equip the nursing with information and screening skills to insure that nurses working in different settings, including maternity nurses are aware about the importance and potential risks related to oral health care on pregnancy outcome.

Additionally, this study will consider a baseline data among pregnant women in Egypt with gingival inflammation to help the health service policy makers to focus on screening and treatment of the oral cavity in

its early stage rather than managing periodontitis and its complications and high costs. Moreover, Preterm birth and low birth weight are significant perinatal health problems, not only in terms of associated mortality, but also with regard to short- and long-term morbidity and financial implications for healthcare systems. Therefore, providing preventive measures in the form of supportive information on oral health care for pregnant women can improve levels of knowledge, practices and lesser gingival inflammation then may contribute to decrease adverse pregnancy outcome.

AIM OF THE STUDY

The aim of the current study is to evaluate the effect of dental care information support on knowledge, practice and gingival condition among pregnant women with gingivitis.

Research Hypotheses

To fulfill the aim of this study the following research hypotheses are formulated:

H1- Pregnant women who will receive dental care information, support will have a higher mean knowledge score than those who receive routine care

H2- Pregnant women who will receive dental care information, support will have a higher practice score than those who receive routine care

H3 Pregnant women who will receive dental care information, support will have the lesser mean gingival condition than those who receive routine care.

OPERATIONAL DEFINITION

Dental Care Information Support

In this current study means the provision of information and dental care prophylaxis procedure (brushing and flossing procedure) to pregnant women about dental health care during pregnancy as measured by pre- post test score level.

Pregnancy Gingivitis

Pregnancy gingivitis is the swelling/inflammation of the gingival tissues gums among pregnant women as measured by bleeding on probing (BOP), probing depth (PD) using periodontal probe and plaque index (PI) score ranged from 0-3 score.

SUBJECTS AND METHODS

Research Design

Quasi-experimental (pre-post-test) research design was utilized in this study.

Sample

A purposive sample of 100 pregnant women who received antenatal care in MCH centers at El - Fayoum governorate were recruited in this study, according to the following inclusion criteria: pregnant women 20 to 35 years old, first and second trimester, not more gravida 3, can read and write, with gingivitis

(mild, moderate & severe gingivitis) based on bleeding on probing (BOP) as a reliable indicator of gingival inflammation, and probing depth ≤ 3 mm. Mothers who have a previous history of preterm labor, smokers, have any chronic pre gestational conditions such as, pre gestational diabetes, chronic hypertension and urinary tract infection will be excluded from the study. The study sample was divided equally 50 subjects each in the study group (50) who received dental care information, support and control group (50) who received routine standard of care based on the policy of the setting.

Setting

The study was conducted in two MCH centers in El- Fayoum Governorate, Urban health center (in Elhadka) and Medical Center of Higher dam. Both settings affiliated with the Ministry of Health which provides free obstetric and gynecologic health care services. Two settings were randomly assigned by toss to be one of them Medical Center of Higher Dam for the study group and the other setting is urban health center (in Elhadka) for the control group.

TOOLS FOR DATA COLLECTION

To achieve the purpose of the current study, seven tools was used to collect the data.

Maternal Assessment Interviewing Questionnaire

Which was developed by research investigators included two parts. a) The first part contains demographic data such as, age, education, occupation, residence and income. b) The second part included data related to obstetric profile such as gravidity, parity and previous maternal complications. Also, included data related to current pregnancy as last menstrual cycle (LMP), expected date of delivery (EDD) and gestational age.

Dental Care Information Tool

This was developed by the research investigator, including questions related to oral health knowledge and practice during pregnancy. A scoring system for this tool includes 22 items and the score is divided into three categories (0-3) score. Score 3 for the correct complete answer, score 2 for correct incomplete, score 1 for do not know and score 0 for a wrong answer. The total knowledge scores were 66. A score less than 28 classified as poor knowledge, a score ranged between 28 - 41 classified as acceptable and score > 41 classified as good knowledge.

Dental Care Practical Tool.

This tool was developed by the research investigator and includes data and practical skills related to brushing and flossing technique. A scoring system for this tool included 12 items and divided into three main scores (0-2) a score 2 for satisfactory answer, score 1 for incomplete satisfactory and score 0 for unsatisfactory. The median point of pre- post test score is (7) that divide study samples into satisfactory and unsatisfactory practice score.

Bleeding on Probing (BOP)

Has been used to diagnose the presence of periodontal diseases, and it is a reliable indicator of gingival inflammation, especially when used in conjunction with other factors (Badersten, Nilvéus, & Egelberg 1990). Moreover, clinical studies support the relevance of BOP in predicting the course of oral periodontal diseases, and they show the absence of BOP to be a reliable indicator of periodontal stability (Aldredge, 2012). Calibrated periodontal probes used to assess BOP. The percentage of sites that bleed can be calculated by dividing the number of bleeding sites by the total number of teeth and the result multiplied by 100 (Scheid, &Weiss 2012).

Plaque Index (PI)

The scale was adopted from (Löe & Silness 1963). This index measured the thickness of plaque on the gingival margin and tooth surface, Based on the following Scoring Criteria; score (0) = No plaque, score (1) = A film of plaque adhering to the free gingival margin and adjacent area of the tooth, which cannot be seen with the naked eye. But only by using, disclosing solution or by using probes, 2 = Moderate accumulation of deposits within the gingival pocket, on the gingival margin and/ or adjacent tooth surface, which can be seen with the naked eye, 3= Abundance of soft matter within the gingival pocket and/or on the tooth and gingival margin. The highest reliability coefficient was observed for pocket depth measurements (0.97), followed by plaque measurements (0.95) (Rise & Tollefsen, 1984).

Probing Depth (PD).

Measurement of the depth of a sulcus or periodontal pocket, determined by measuring distance from a gingival margin to the base of the sulcus or pocket with a calibrated periodontal probe. The average, healthy is ranging from (0-3mm) or ≤ 3 mm. Depths greater than 3 mm can be associated with "attachment loss" of the tooth to the surrounding alveolar bone, which is a characteristic found in periodontitis. (Nield-Gehrig & Willmann, 2003).

Maternal Evaluation Tool

This tool was developed by the research investigator and includes two parts; (1) Gingival inflammation improvement scale was monitored by the research investigator at the end of fourth weeks after implementation of information support; and (2) change of mean knowledge and practice scores via post-test tool.

PILOT STUDY

A pilot study was carried out among 10% of the total sample (10 pregnant women) to identify any difficulties that needed to be handled before applying it, to confirm the clarity of questionnaire items and approximately identify the time needed to answer questions. The pilot study lasted one month and necessary modifications were done according to the result of the pilot study. Also, based on the results of a pilot study as some questions were added such as the types of foods that can effect or maintain dental health. Also, some questions were omitted from the questionnaire such as age as a risk factor for increase gum disease and some question needs to be rephrased to provide better meaning. Women in the pilot were excluded from the main

study sample because of the modification needed.

Ethical Consideration

A primary approval was obtained from the research ethics committee of Faculty of Nursing - Cairo University. Permission was obtained from the administrative personnel of MCH centers to conduct the study. Written informed consent was obtained from each woman after explaining the purpose, nature and benefits of this study.

PROCEDURE

The study was applied after an official permission for data collection was obtained from the ethics committee of Faculty of nursing, Cairo University to and an official permission was obtained from MCH center administrative personnel to carry out the study. The research investigator introduces herself to pregnant women and explain the purpose, importance and benefit of the study obtain their acceptance to participate in this study as well as, to gain their cooperation. All women who met the inclusion criteria were recruited for the study after asked for written consent. Data were collected through four phases: preparatory phase; interviewing and assessment phase, implementation phase, and evaluation & follow up phase.

Preparatory Phase

During this phase, the research investigator received training by dentist supervisor for one month to perform assessment of gingival conditions based on Bleeding on Probing (BOP) scale and measurement of Probing Depth (PD) by using a periodontal probe as well as, the research investigators learn to assess the degree of plaque index, the research investigator develops tools for data collection after reviewing pertinent literature and prepared the content of the information support sessions. Also, during this phase the research investigator designed educational booklet and brought model for jaw and tooth structure to be used during the practical sessions.

Interviewing and Assessment Phase

All the pregnant women in both groups were interviewed individually to collect data related to demographic, past and present obstetrical profile, baseline knowledge and practice for dental care during pregnancy. Personal interview was done for both groups at the outpatient clinic during their prenatal visit in the dental clinic. The investigator was facing the women, asked her the questions in Arabic language and recorded her answers on the questionnaire sheet. Also, during this phase, (first visit) each pregnant mother was assessed for plaque index (PI), probing depth (PD), and bleeding on probing (BOP) for periodontal status using Löe and Silness, (1963) and during this phase, if the probing depth (PD) is more than 3mm, the pregnant women were excluded from the study sample.

Implementation Phase

The proposed information support was carried out after the assessment phase for the study group only. The study sample was divided into 5 subgroups included 10 pregnant women in each group. The dental

care information, support has been implemented in four sessions: two theoretical and two practical sessions: It was implemented at a rate of one session per week for each subgroup based on the time plan schedule

First Theoretical Session

This session took about 35-45 minutes; the research investigator provided information, support related to oral and dental health, anatomy of teeth, functions and the impact of pregnancy on dental health, as well as, gingivitis associated with pregnancy.

Second Theoretical Session

This session took about 35-45 minutes: This session discusses the impact of gingival inflammation on pregnancy outcomes, the importance of visiting the dentist and healthy nutrition related to oral and dental health. All the contents were presented through power point presentation. Each theoretical session was carried out at room included in antenatal clinic and the research investigator allowed (10 minutes) to receive feedback from the study group

First and Second Practical Sessions

This session included practical training on how to use the toothbrush and dental floss in a correct and safe manner by using jaw and teeth model with a tooth brush as a teaching material by using demonstration and re-demonstration. Also, the research investigator provides an educational video to explain the proper oral hygiene techniques for the brushing and dental flossing to help pregnant women. All pregnant women for the study group re-demonstrated the procedure once or more under the observation of research investigators to ensure the correct performance of the procedure.

Also, each pregnant woman obtained a copy of an educational booklet in Arabic language included all theoretical and practical content. In addition, the investigator provided all study samples an adequate amount of toothbrush, toothpaste or dental floss until the end of the data collection phase. Also, during this phase an open channel communication (through phone calls) was achieved between the research investigator and pregnant women to answer any question, and to increase oral health compliance among the study sample weekly or every one week.

Evaluation and Follow Up Phase

This phase was carried out in both groups (Study and control groups). For study groups, evaluation was done after finishing the four sessions to re-evaluate or reassessment again for going-over status (PI, GI and PD record) as well as, and evaluate the level of knowledge and practice via the same questionnaire sheet (the post-test). Also, the same above assessments were carried for control groups after four weeks from the beginning of interviewing and assessment phase.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 16.0 for Windows. Data were summarized and tabulated using descriptive and inferential statistics such as mean and standard deviation. Comparison of qualitative variables different categories was done using the Chi -

square test of significance. While quantitative variables were compared using student t test for independent groups. Also the threshold of significance was fixed at 0.05 Probability (p-value) more than 0.05 was considered non-significant, p-value less than 0.05 was considered significant, and p-value less than 0.01 was considered as highly significant (Munro, 2005).

RESULTS AND DATA ANALYSIS

The results of the current study included two main sections: **Section 1**. Description of the sample according to their: **a**. Demographic characteristics. **b.** Obstetrical profile. **c.** Baseline assessment of knowledge and practices of dental health care. d. Baseline assessment of gingival condition. **Section2.** The effect of dental care information support on**: a.** Levels of knowledge and practices. b. The effect of dental care information support on gingival condition.

SECTION 1

Description of the sample of Demographic characteristics, it includes age of pregnant women, educational level, occupation, residence, insurance and income.

Table 1: Distribution of Sample According to Age in Study and Control Groups

		Study Group N=50		Control Group N=50		P Value
		N.	%	N.	%	
Age	20-24 years	35	70.0%	31	62.0%	0.63
	25-29 years	6	12.0%	10	20.0%	
	30-35 years	9	18.0%	9	18.0%	
Mean age		Mean	± SD	Mean	± SD	
		23.92	±5.22	24.42	± 5.14	

Table (1) Showed that the age ranges of the study sample was 20-35 years. 70% of the women in the study group and 62% in the control group their age ranged between 20-24 years. While, 12% of the study group and 20% in the control group their age ranged between 25-29 years. With a mean age among study group 23.92±5.22 compared to a mean of 24.42±5.14 among the control group with no statistical significant differences was found between the two groups (p= 0.63) which denotes homogeneity among the both groups.

Table 2: Distribution of the Sample According to Demographic Characteristics for Study and Control Group.

Items	Study group		Control group		P value
	Freq.	%	Freq.	%	
Level of education	**N = 50**		**N = 50**		
Can read and write	10	20	10	20	
Primary	5	10	3	6	
Preparatory	6	12	4	8	
Secondary	14	28	25	50	0.06
Intermediate	6	12	5	10	
University	9	18	3	6	
Occupation					
Housewife	48	96	43	86	0.160
Worker	2	4	7	14	
Residence					
Rural	24	48	33	66	0.069
Urban	26	52	17	34	
Insurance					
Yes	1	2	5	10	0.092
No	49	98	45	90	
Income					
500-<750	18	36	20	40	
750-<1000	19	38	23	46	0.319
>1000	13	26	7	14	

Regarding to the level of education (table 2) the study findings shows that 28% among the study group and 50% among the control group had received secondary education, while 18% and 6% of the study and control groups had received university education with no statistical significant difference (p= 0.06). Also, the majority of the study samples (96%) in the study group as compared to 86% of them in the control group were housewives. With no any statistical significant difference was found between the two groups (p = 0.160). As regards to residence, 52% of the study group residence in urban areas compared to 66 % of the control group was residing in rural areas. With no statistical significant difference was found between the two groups in relation to residence (p= 0.069).

Also, table 2 showed that, the majority of the women in the study and control groups has no insurance (98% & 90% respectively). With no any statistical significant difference was found between the two groups (p= 0.092). The monthly family income among the study sample ranged between <500->1000 pounds. Thirty six percent in the study group vs. 40% in the control group their monthly income between 500 < 750 pounds/month while 38 % of the study group vs. 46% in the control group their income between 750 < 1000 pounds.. There was no statistical significant difference was found between two groups in relation to monthly family income (p= 0.319), which denotes homogeneity among the both groups.

Table 3: Distribution of the Sample According to Pervious and Current Obstetric Profile For Study and Control Groups

Items	Study group		Control group		P value
	Freq.	%	Freq.	%	
Gravidity	**N = 50**		**N = 50**		
Primigravida	23	46	21	42	0.667
Multigravida	27	54	29	58	
Parity					
nullipara	23	46.0%	25	50.0%	0.87
primipara	11	22.0%	9	18.0%	
Para three	16	32.0%	16	32.0%	
Previous pregnancy complication	**N = 27**		**N = 29**		
Yes	9	33.3	12	41.4	0.534
No	18	66.7	17	58.6	
	N = 9		**N = 12**		
Types of complications					
Abortion	5	55.6 %	9	75 %	0.203
Ante-partum hemorrhage	4	44.4 %	2	16.7 %	
Preeclampsia	0	0	1	8.3 %	
Mean current gestational age	17.52 ± 4.97		17.4 ± 4.78		0.619

Table (3) shows that obstetrical profile among study and control groups in relation to gravidity, parity, maternal, outcome in a previous pregnancy and current obstetrical data in related to mean of gestational age. The result of this study reveals that no statistically significant relationship was found between both groups in relation to gravidity, parity and previous pregnancy complications. As well as the mean gestational age was 17.52 ± 4.97 for the study group compared with 17.4 ± 4.78 of the control group (p= 0.619).

BASELINE ASSESSMENT OF DENTAL HEALTH CARE KNOWLEDGE AND PRACTICES

Regarding to the baseline knowledge to score the results show that the percentage of correct, complete answers is 32.65% in the study group as compared with 30.3 % in the control group. While, 20.2% of them in the study group had correct incomplete answers as compared with 22.4% in the control group, 34.2% in the study group had don't know answers as compared with 36.3% in the control group. Moreover, 12.9% of the study group had wrong answers vs. 12.4% in the control group (Table 4).

Table 4: Distribution of the Women Regarding to Baseline Knowledge In the Study and Control Groups.

Items	Study Group (N= 50)		Control Group (N= 50)	
	Freq.	%	Freq.	%
Correct, complete answers	336	32.65	289	28.9
Correct incomplete answers	208	20.2	224	22.4
Don't know	352	34.2	363	36.3
Wrong answers	133	12.9	124	12.4

* Number is not mutually exclusive

As regards to the level of knowledge, findings of this study indicate that 20% of women in both groups had poor knowledge, 56 % of women in both groups had acceptable knowledge and 24% of them had good knowledge in both

groups. No significant differences are found between both groups (p= 0.99). Moreover, the mean knowledge score in the study group is 35.52 ± 9.8 as compared with 35.22 ± 9.54 in the control group. There no significant difference is found between both groups (T = 0.16 & p = 0.87) (Table 4).

Table 5: Distribution of the Women According to Their Base Line Knowledge Level In the Study and Control Groups

Levels of Knowledge	Study group (n= 50)		Control group (n= 50)	
	Freq.	%	Freq.	%
Poor Knowledge Level	10	20	10	20
Acceptable Knowledge Level	28	56	28	56
Good Knowledge Level	12	24	12	24
Mean	35.52 ± 9.8		35.22 ± 9.54	

Regarding to the baseline practice score, the results in the current study showed that 30.2% in the study group as compared with 27% in the control group had satisfactory score. 23.2% in study group vs. 23.5% in the control group had an incomplete satisfactory score while 46.6% in the study group as compared to 49.5% in the control group had an unsatisfactory score (table 6). In relation to the level of practice, the results showed that, 44% in the study group compared with 62% in the control group had an unsatisfactory level of practice. While, 56 % of the study group compared with 38 % in the control group had a satisfactory level of practice. The mean practice score was 6.66 ± 4.05 in the study compared with 5.8 ± 4.51 in the control group. There was no significant difference between both groups (T = 1.002 & p = 0.319) (Table 7).

Table 6: Distribution of the Women Regarding to Baseline Practice In the Study and Control Groups.

Types of answer	Study group (n= 50)		Control group (n= 50)	
	Freq.	%	Freq.	%
Satisfactory	120	30.2	101	27
Incomplete Satisfactory	92	23.2	88	23.5
Unsatisfactory	185	46.6	185	49.5

* Number is not mutually exclusive

Table 7: Distribution of the Sample According To Their Base Line Level of Practice In the Study and Control Group.

Levels of practice	Study group (n= 50)		Control group (n= 50)	
	Freq.	%	Freq.	%
Unsatisfactory	22	44	31	62
Satisfactory	28	56	19	38
Mean	6.66 ± 4.05		5.8 ± 4.51	

BASE LINE ASSESSMENT FOR GINGIVAL CONDITION

Regarding to the baseline gingival assessment condition which includes bleeding on probing (BOP), plaque index and probing depth. The results of the current study reveal that the mean value of bleeding on probing (BOP) is 11.27± 3.2 in the study group as compared with 12.4 ± 3.1 in the control group, with no statistical significance difference is found between two groups (p=0.075). Additionally, the mean plaque index score in the study group is 85.4906± 9.55945 as compared with 87.0202± 7.92940 in the control group.. Similarly, no significance difference in relation to plaque index at baseline examination was observed between two groups, as observed (p= 0.386) (Table 8).

Table 8: Distributions of the Sample According to Meaning Bleeding To Probing (Bop) and Plaque Index (Pi) Score

	Study group N= 50	Control group N= 50	P value
Periodontal parameters	Mean ± SD	Mean ±SD	
BOP scores	11.3 ± 3.2	12.4156 ±3.1	P=0.075
Plaque index	85.4906 ± 9.5	87.0202 ± 7.9	P= 0.386

SECTION 2

EFFECT OF INFORMATION SUPPORT ON LEVEL OF KNOWLEDGE AND PRACTICES

The results of the current study reveal improvement in the level of knowledge among the study group is from 24% good level of knowledge before the implementation of information support compared to 100% after four weeks of implementation. In addition, the current table shows that improvement in the mean knowledge score among the study group from 35.52±9.08 of pre-test knowledge score compared to 57.94±4.87 post-test knowledge score with a highly significant difference (p=0.00). (Table 9). Meanwhile, the mean knowledge score among control group were not changed this denotes effect of information support on mean knowledge score among the study group.

Additionally, the results of the current study reveal improvement in the level of practice among the study group is from 56% satisfactory levels before the implementation of information support compared to 100% after four weeks of implementation. In addition, the current table shows that improvement in the mean practice score among the study group from 6.66 ± 4.05 of pre-test practice score compared to 20.78 ± 2.13. Post-test practice score with a highly significant difference (p = 0.000, Chi square 28.2) Table 9.

EFFECT OF INFORMATION SUPPORT ON GINGIVAL CONDITION:

Regarding to the effects of information support on the gingival condition through measuring the periodontal parameters BOP, PI and PD) after four weeks from the beginning of the implementation phase. The results show obvious improvement of the gingival condition among the study group as the mean of bleeding on probing significantly decreased since 11.27 ± 3.22 before the implementation to 4.38±1.69 with a highly significant difference (p = 0.00). Moreover, the mean of plaque index in the study group also decreased from 85.49 ± 9.5 before implementation to 47.02 ± 9.09 after implementation with a highly statistically significant difference between baseline assessment and after four weeks (p = 0.00) (Table 9).

Table 9: Levels of Knowledge, Practice and Gingival Conditions before and After Four Weeks of Information Support

Items	1st test (Baseline)				P value	2nd test (after four weeks)				P value
	Study n=50		Control n=50			Study n=50		Control n=50		
	Freq.	%	Freq.	%		Freq.	%	Freq.	%	
Levels of Knowledge										
• Poor	10	20	10	20		0	0	9	18	P= 0.000
• Acceptable	28	56	28	56	0.87	0	0	28	56	
• Good	12	24	12	24		50	100	13	26	Chi square 53.7
The mean knowledge score	**Mean ± SD**		**Mean ± SD**			**Mean ± SD**		**Mean ± SD**		
	35.52 ± 9.8		35.22 ± 9.54			57.94 ± 4.87		35.14 ± 9.25		
Levels of practice										P = 0.000
• Unsatisfactory	22	44	31	62	T = 1.002	0	0	28	56	Chi square
• Satisfactory	28	56	19	38	p = 0.319	50	100	22	44	28.2
The mean practice score	**Mean ± SD**		**Mean ± SD**		***P value***	**Mean ± SD**		**Mean ± SD**		***P value***
	6.66 ± 4.05		5.8 ± 4.51		0.319	20.78 ± 2.13		6.00 ± 4.67		0.000
Periodontal parameters	**Mean ± SD**		**Mean ± SD**		***P value***	**Mean ± SD**		**Mean ± SD**		***P value***
BOP score	11.3 ± 3.2		12.41 ± 3.1		0.075	4.38 ± 1.69		12.96 ± 5.48		0.00
Plaque index	85.49 ± 9.5		87.02 ± 7.9		0.386	47.02 ± 9.09		84.47 ± 13.15		0.00

DISCUSSIONS

Pregnancy is a state of physiological condition that brings about various changes in the oral cavity along with other physiological changes taking place throughout the female body (Patil, Thakur, Paul, &Gadicherla, 2013). Good oral health during pregnancy is important because the condition of a pregnant woman's oral health can affect her health and her unborn fetus (Achtari, Georgakopoulou & Afentoulide., 2012). Moreover, pregnant women must be educated about the importance of maintaining good oral hygiene, expected changes in the oral cavity and routine dental visits (Naseem, et al., 2016).

Therefore, the aim of the current study is to evaluate the effect of dental care information support on knowledge, practice and gingival condition among pregnant women with gingivitis. Discussion of the current study, findings will be presented to answer the research hypotheses.:H1- Pregnant women who will receive dental care information, support will have a higher mean knowledge score than those who receive routine care H2- Pregnant women who will receive dental care information, support will have a higher practice score than those who receive routine care H3 Pregnant women who will receive dental care information support will have the lesser mean gingival condition than those who receive routine care.

Finding of the current study will support the two research hypotheses. H1- Pregnant women who will receive dental care information, support will have a higher mean knowledge score than those who receive routine care. H2- Pregnant women who will receive dental care information, support will have a higher practice score than those who receive routine care.

Regarding to mean knowledge score, the findings of the current study showed a significant improvement in the level of mean knowledge score after implementation of the information, support where 100% of the pregnant women in the study group had a good knowledge compared to base line knowledge score 24% in the pre-test. Also, a highly significant difference (p=0.00) was recorded between the mean knowledge score in posttest (57.94±4.87) and pre-test (35.52±9.08).

As regards **to** the level of the practical results of the current study reveals improvement among the study group from 56% satisfactory levels before the implementation of information support compared to 100%

after four weeks of implementation. Also, the result shows that improvement in the mean practice score among the study group from 6.66 ± 4.05 of pre-test practice score compared to 20.78 ± 2.13. post-test practice score with a highly significant difference ((p = 0.000, Chi square 28.2).

These findings in agreement with Chawla, et al., (2017) who reported that Intensive oral health education during pregnancy leads to improvement in knowledge, attitude, Practice, and gingival health. Additionally Cardenas & Ross (2010) carried out study to evaluate the gain in knowledge of oral health after education to pregnant women on dental anticipatory guidance and to determine how much of this information pregnant women can retain and reported that the mean overall correct scores for the pre-test was 12.9 (53.75%), post-test was 20.9 (87.08%) and follow-up test after four weeks from first visit was 20.17 (84.05%).

In the same context, Nakre, & Harikiran (2013) reported that oral health education is effective in improving the knowledge, attitudes, and practices of oral health. Moreover Bahria et al., 2015 showed the positive effects of a short-term oral health education intervention during pregnancy on pregnant women's oral and dental health in the form of more positive beliefs and better behaviors. Also, the results consistent with Bahri, Iliati, Bahri, Sajjadi & Boloochi (2012) they reported that educational programs for pregnant women show a significant difference between knowledge, attitude, and behavior scores at the beginning and the end points.

In addition, Ramazani et al. (2014) conducted a study aimed to evaluate the effects of different methods of anticipatory guidance presentation on the change of knowledge and attitude of pregnant women regarding oral health care in the mother, infant and toddler and reported that Anticipatory guidance presentation led to change in the score of knowledge about maternal, infant and toddler's oral health and attitude towards maternal oral health in comparison to no presentation. Moreover, in Bahri, Iliati, Bahri, Sajjadi & Boloochi. (2012) founded, there was a significant difference between knowledge, attitude, and behavior scores at the beginning and the end of the educational program.

Also, findings of the current study support the third hypothesis. H3 Pregnant women who will receive dental care information, support will have the lesser mean gingival condition than those who receive routine care. This hypothesis were accepted as the study findings revealed that, most pregnant women demonstrate the improvement gingival condition (lesser sign of gingival inflammation with the decrease of plaque index) post-program than pre-programmed.

Regarding to the gingival condition finding of the current study showed improvement after implementation of information support than before. The mean of Bleeding on probing was decreased from 11.27± 3.22 to 4.38±1.69 with significance difference (p= 0.00). Moreover, the mean Plaque index PI has decreased since 85.49 ± 9.5 to 47.02±9.09 after four weeks from the beginning of implementation among the study group with a highly significant difference (p = 0.00).

In agreement with this finding, Geisinger et al. (2014) reported that the combined approach of oral hygiene counseling, powered tooth brushing, dental floss and mouth rinse, and dental prophylaxis were significantly effective to reduce the PI, GI, and PD values among pregnant women over an 8-weeks. In the

same context, Sambunjak et al. (2011) reported that flossing combined with tooth brushing was effective for improving gingivitis as pregnant women who more knowledgeable about oral health were tended to practice health behaviors such as flossing than others. Flossing has been shown to be effective in preventing the development of gingival inflammation and reducing the level of plaque (Barendregt et al., 2002).

Similarly, Noguchi, et al. (2016) carried out a study to examine the efficiency of an oral health education program on periodontal disease among Japanese low-risk pregnant women. The result showed that educational intervention and the toothpick method brushing could prevent exacerbation of periodontal disease or can improve the status of periodontal symptoms during pregnancy. In the same line, Weidlich, et al. (2013) showed that, statistically significant and substantial improvements in clinical periodontal measures with Comprehensive periodontal treatment and strict plaque control (e.g. Bleeding on probing (BOP) was reduced from 50% to 11%).

CONCLUSIONS AND RECOMMENDATIONS

The findings of the current study show that, providing information support for pregnant women about oral health care improvement their knowledge and practice as well as improvement in the degree of gingival inflammation associated with pregnancy. So, based on the finding of the current study the following are recommended.

Implement oral health guideline to integrate oral health screening through a routine antenatal check up.

Programs to educate mothers about the importance of oral and dental health care during and before planning for pregnancy.

Future directions of oral health research should target oral health care before, during and after pregnancy.

. Longitudinal studies are needed to assess the long-term effect of oral health education programs in maternity care centers on dental health knowledge and behavior of pregnant women.

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