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Document heading **doi: 10.21276/apjhs.2017.4.2.9** **Research article**

Coverage of the Oral Healthcare services providing for Antenatal mothers in the district of Gampaha, in Sri Lanka

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ABSTRACT

Introduction: Antenatal oral healthcare programme was introduced in Sri Lanka with the collaboration of existing Maternal and Child Health (MCH) programme in 2009 to provide evidence based oral healthcare to all antenatal mothers. **Objectives:** To assess the coverage of care of the National Programme for providing Oral Healthcare to Pregnant Mothers in the district of Gampaha. **Methodology:** A descriptive cross sectional study was conducted during 2013 – 2014 to assess the programme coverage in terms of availability, accessibility and utilization of the services. Information was gathered from document analysis using previous records. A community survey was also conducted among 240 antenatal mothers selected from 20 MCH clinics in the district. **Results:** The number of registered pregnant mothers per government Dental Surgeon was 916 in the year 2013. The service availability was satisfactory only in four MOH areas out of 15 in the district. The physical accessibility data revealed 67.5% of mothers resided within five kilometers from a government dental clinic, whereas it was 80% from a private dental clinic. The oral screening and treatment completion coverage found were 45% and 15% respectively. **Conclusion and recommendation:** There is an issue of low 'coverage' of care in the district. Oral screening coverage could be improved by increasing frequency and number of clinics targeting antenatal mothers. Adequate supervision and regular monitoring and evaluation of the programme at all levels in various stages are essential to improve the coverage of care.

Keywords: Coverage, Pregnancy**,** Oral health

Introduction

Pregnancy is a special event which brings an abundance of changes in women's life. It is characterized by complex physical, physiological, behavioural and emotional changes. These changes that occur during pregnancy may increase women's susceptibility to oral diseases. Changes in the periodontium are well documented in 30-100% of pregnancies [1]. A woman's dental caries risk may also increase during pregnancy due to changes in diet and oral hygiene practices.

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The experience of pain, endurance of dental abscesses, bleeding gums, problems with eating and chewing associated with untreated oral diseases can adversely affect pregnant women's daily living and well-being. Dental erosion is another common condition during pregnancy due to frequent nausea and vomiting. Therefore, pregnant mothers are one of the most important population groups with special needs in terms of oral healthcare. Oral health plays an important role in overall health and wellbeing of pregnant women [2]. Periodontal infections during pregnancy not only affect the mother, but also may be harmful to the foetus, if left untreated. Numerous studies have shown the possibility of adverse pregnancy outcomes such as preterm birth, low birth weight, pre-eclampsia and gestational diabetes due to maternal periodontitis [3, 4]. Poor oral health in adults is also associated with chronic diseases such as cardiovascular disease and diabetes which may affect women's general health

during pregnancy [5]. Preserving a woman's oral health throughout pregnancy can promote the oral health of her children by decreasing the potential for early childhood caries. Dental caries is an infectious and transmissible disease initiated by oral colonization of cariogenic bacteria mainly Streptococcus mutans [6]. These bacteria can be transmitted to the child during the first two to three years of life by the persons in closest contact with it - typically the mother. The early acquisition of these bacteria in an infant's mouth is a key risk factor for dental caries in early childhood and throughout life [2]. Research evidences show that maternal untreated caries increases likelihood of developing dental caries in young children [7-9]. The National Oral Health Survey of 2002-2003 in Sri Lanka providing information about the oral health status of the females in the reproductive age group has reported that 47.2% of the 15-year-old females and 78.4% of the 34-44 year old age group have active dental caries [10]. The periodontal treatment needs of these two age groups were 74.8% and 88.8% respectively. A study done by Karunachandra in 2008 revealed the prevalence of dental caries among pregnant mothers in Divulapitiya MOH area was 92% with a mean DMFT (Decayed, Missing, Filled Teeth) of 5.4 (SD=3.0). The prevalence of periodontal disease was 93% and bleeding on probing was the most predominant sign of periodontal disease [11]. Periodontal diseases may cause poor birth outcomes like low weight births and pre-term births. The Sri Lanka Demographic and Health Survey in 2006/2007 revealed the prevalence of low birth weight in Sri Lanka as 16.7% [12]. It is nationally recognized as a public health problem and some portion of it may be attributable to periodontal diseases according to recent findings. Moreover, dental caries marked the most common childhood health problem in Sri Lanka. According to the statistics of the last National Oral Health Survey in 2002/2003 in Sri Lanka, 65.5% of the 5-year-old children suffer from dental decay. On an average each child in this age group experience more than three decayed teeth [10].Shahim (2003) had shown that the prevalence of dental caries increases from 23% to 65% between the age one and two years in children in Sri Lanka and this sharp increase was attributed to the beginning of weaning practices of infants [13]. The role of mothers as change agents is also important in imparting oral health knowledge and in influencing other members of the family to be changed towards a positive way of health. Thus, provision of timely oral healthcare during pregnancy is an essential component in the improvement of quality of life in pregnant women and their families. Currently there is a globally recognized initiative to encourage oral healthcare in pregnancy within the 'primary healthcare setting'. This 'primary healthcare setting' can be utilized more conveniently during pregnancy to provide oral healthcare services to low income mothers who are at greater risk of delivering pre-term and low birth weight infants. Many women are health conscious and receptive to health education interventions during pregnancy and prenatal oral health programmes have been reported to be effective in improving oral health outcomes during pregnancy [14]. In the recent past there has been an enormous growth in the volume of research which is relevant to the oral healthcare during pregnancy. It provides advanced knowledge on the possible connection between oral health and pregnancy. Numerous organizations of oral health professionals have developed guidelines, policy statements and recommendations addressing oral healthcare during pregnancy. According to California Dental Association Foundation (2010), dental treatment can be delivered safely at any time during the pregnancy with no more fetal or maternal risk when compared to the risk of not providing care. The evidence based guideline they formulated includes practice recommendations for both community based programme providers and healthcare providers [15].The British Dental Association, Australian Dental Association and American Dental Association agreed upon the safety of routine dental care during pregnancy especially during the second trimester. On the other hand, emergency dental treatment should be carried out at any time during pregnancy for the well-being of the mother and baby. Moreover the National Consensus Statement on Oral Healthcare during Pregnancy was formulated through an expert work group meeting held in Washington to increase the health professionals' awareness of the importance and safety of women's oral healthcare during pregnancy [16]. In medical profession, there is a long history for the recognition of importance of providing prenatal counseling and care to expectant mother. Similarly, oral health professionals also can make an important contribution for the primary prevention of oral diseases by attending to women's oral health during pregnancy and providing prenatal counseling related to maternal &infant oral health [17]. As such antenatal oral healthcare was made compulsory to all mothers attending antenatal clinics in Sri Lanka to promote oral health among mothers and children as a component of improving their quality of life. Universal oral health coverage is an objective of the 'Strategy for oral health in South-East Asia, 2013-2020' [18]. It is defined as 'Improving access to primary oral health care of the entire population, particularly in underserved areas'. The 'Coverage' of healthcare distinguishes different measures of

provision of healthcare in terms of such concepts as availability, accessibility and utilization of services [19]. Amidst all the endeavors to propagate oral healthcare during pregnancy, it has been observed that there has been very poor coverage of oral healthcare services among antenatal mothers. The latest national review conducted by the Family Health Bureau indicates 36% and 41% oral screening coverage in Sri Lanka during the year 2012 and 2013 respectively [20]. This study may further investigate the coverage of care in the district of Gampaha and explore the underlying reasons behind the poor coverage in the district, in spite of all endeavors for the successful implementation of the programme.

Materials and Methods

A descriptive cross sectional study was conducted and information was gathered during 2013 to 2014 by previous records kept in office of the Regional Dental Surgeon and the respective dental clinics in the district. A structured interview was also conducted among 240 antenatal mothers attending 20 MCH clinics in the district and they were clinically examined to assess the healthy mouth status and the treatment completion status. This study was conducted in 15 out of 16 MOH areas in Gampaha district. The MOH area BOI Katunayaka was excluded since its services were limited only to the working population of BOI and there were no field MCH clinic services similar to other MOH areas. These 15 MOH areas were comprised of 33 government dental clinics and 178 field MCH clinics which were under the administrative control of Regional Directorate of Health Services, Gampaha. These government dental clinics included 25 hospital dental clinics (HDC), six adolescent dental clinics (ADC) and two community dental clinics (CDC).The programme coverage was measured in terms of availability, accessibility and utilization of the services. The service availability was reported as Dental Surgeon population ratio. It was calculated for the most recent year completed (2013). The accessibility was measured in terms of physical accessibility to both government and private dental clinics. The utilization was measured in terms of screening % (Proportion of pregnant mothers screened out of the number of mothers registered by PHMM), treatment completion %(Proportion of pregnant mothers who completed necessary dental treatments during pregnancy out of the number of mothers registered by PHMM) and overall service coverage % (Proportion of pregnant mothers without active oral disease after screening and treatment completion out of the number registered. They were calculated for all the completed years after implementation of the programme (2010, 2011, 2012 and 2013). Data collection to assess the availability and utilization of services was done by the Principal investigator (PI) with the assistance of two research assistants trained and employed by the PI. It was decided to obtain the relevant data from the monthly returns of Dental Surgeons compiled at regional office. The necessary data were extracted from the records and returns maintained at the RDHS office. If the returns were not available it was decided to check the registries maintained in the respective dental clinics. These data were collected using data extraction forms. All antenatal mothers whom in their third trimester (Pregnant mothers who completed 28 weeks of period of amenorrhea) attending field antenatal clinics were considered as eligible for the community survey. Only the mothers in their third trimester were selected to provide them maximum time duration to be exposed to the activities of the oral healthcare programme. Twenty MCH clinics were selected from the district using the systematic sampling method and 12 mothers were decided to select randomly from each clinic to obtain the total sample size of 240. All mothers those who resided in the study area for less than one year were excluded because some mothers come to their home town temporarily close to the time of their expected date of delivery after taking oral care from other districts.

A pretested interviewer administered questionnaire was given to the eligible clients after confirming the eligibility by referring to the week of gestation from the pregnancy record (H 512A) to assess the utilization and the accessibility to the services. It was conducted in a separate place at the clinic premises minimizing possible disturbances to the clinic activities. The place was specifically arranged with suitable environment to conduct a confidential interview with the respective client. It was administered by two trained Data Collectors. Dental Surgeons having previous work experience in Community Dental Clinics were selected as Data Collectors. Information obtained from the mothers regarding the utilization of oral healthcare services were confirmed by referring to the Pregnancy Record A and subsequent clinical evaluation by the PI. After the interview each mother was invited one by one for an 'on-site oral health examination' which was carried out by the PI at a pre-arranged place in the clinic center. PI was the sole clinical examiner and 'healthy mouth status' and 'treatment completion status'were assessed using pre-adopted criteria to

confirm their 'oral health status' after obtaining dental care. Pregnant mother was comfortably seated on an ordinary chair and the examination was carried out under the day-light. The examiner stood right behind the pregnant mother and examination was performed using plain mouth mirrors and CPI (Community Periodontal Index) probes. The examination findings were recorded in an oral health assessment form by a trained recorder. The examination findings of the PI were consistent with the pregnancy records (H-512 A) except four records where Dental Surgeon's documentation was not available for comparison. At the end of collection of data, the data gathered was manually checked and data entry was done after data cleaning and coding. Data analysis was done by the PI using statistical package for social sciences (SPSS) software version 16. Indicators of the 'coverage' of the programme was calculated and presented according to the predefined cut off values. The cut-off value decided for the 'service availability' was 520 pregnant mothers per Dental Surgeon for a given year. It was based on the Practice Guidelines that recommended all Dental Surgeons in hospital/ adolescent /community dental clinics should screen and treat at least 10 pregnant mothers per week [17]. The cut-off value set for the physical accessibility was 50%. It was based on the 'National Oral Health Survey – 2002/ 2003 report' that stated, if more than 50% of respondents reported to be having a dental clinic within five kilometers it is an evidence for the accessibility of oral healthcare services [10].The cut-off value set for the 'screening coverage' was also decided based on the annual screening target of pregnant mothers given for Dental Surgeons providing care based on the Practice Guideline [17]. Ethical approval for the study was granted by the ethics review committee of the Faculty of Medicine, Colombo.

Results

Table 1 describes the service availability of the district by MOH areas in the year 2013

Table 1: Distribution of Service Availability by MOH areas in Gampaha District

MOH area	No. of registered pregnant mothers	No. of govt. Dental Surgeons*	No. of mothers per govt. Dental Surgeon*
1.Attanagalla	3324	8	**415**
2.Biyagama	3639	2	**1819**
3.Divulapitiya	2559	3	**853**
4.Dompe	2796	6	**466**
5.Gampaha	3091	7	**441**
6.Jaela	2359	1	**2359**
7.Katana	1986	0	**-**
8.Kelaniya	2391	2	**1195**
9.Mahara	3495	2	**1747**
10.Meerigama	2968	4	**742**
11.Minuwangoda	3029	1	**3029**
12.Negombo	2691	6	**448**
13.Ragama	1264	1	**1264**
14.Seeduwa	2649	0	**-**
15.Wattala	2928	2	**1464**
Total District	**41246**	**45**	**916**

(*Considered only the Dental Surgeons working in HDCs, CDCs and ADCs under the administrative control of Regional Directorate of Gampaha)

The mean number of registered pregnant mothers per government Dental Surgeon was 916 in the district of Gampaha. According to the cut-off value of 520 mothers per Dental Surgeon, the service availability was not satisfactory in the district of Gampaha. The service availability was satisfactory only in four MOH areas out of 15, where there were less number of pregnant mothers per Government Dental Surgeon compared with the annual target (520) allocated. Thus, the service availability was considered as satisfactory in MOH area Attanagalla, Dompe, Gampaha and Negombo.

Table 2 shows the percentage distribution of clients according to access to the dental clinic.

Table 2: Distribution of the study sample of Antenatal mothers by Accessibility to a Dental clinic (Perceived distance of traveling to the dental clinic from home)

Distance to the closest dental clinic from home	Government Clinic		Private Clinic	
	No.	%	No.	%
Up to 5 km	162	67.5	192	80.0
More than 5 km	70	29.2	36	15.0
Don't know	8	3.3	12	5.0
Total	240	100.0	240	100.0

Among those who were interviewed, 67.5% of mothers resided within five kilometers from a government dental clinic and 80% of mothers resided within five kilometers from a private dental clinic. The physical accessibility to both government and private dental clinics was satisfactory according to the 50% of cut-off accepted for easy access.

Table 3 presents the oral screening coverage of the district by MOH areas from the year 2010 to 2013.

Table 3: Distribution of Service Utilization (Screening Coverage %) by MOH areas in Gampaha District for the Years, 2010/ 2011/ 2012/ 2013

MOH area	Screening Coverage								*Screening target = No. of Dental Surgeonsx520
	2010		2011		2012		2013		
	No.	%	No.	%	No.	%	No.	%	
1.Attanagalla	186	5.9	202	5.9	193	5.8	629	18.9	8x520=4160
2.Biyagama	451	12.7	487	13.2	52	1.4	166	4.5	2x520=1040
3.Divulapitiya	1221	49.9	415	15.8	1089	42.5	2097	81.9	3x520= 1560
4.Dompe	412	15.3	230	8.2	628	22.4	399	14.2	6x520=3120
5.Gampaha	341	10.8	231	7.2	337	10.9	692	22.3	7x520=3640
6.Jaela	295	12.4	94	3.7	258	10.9	392	16.6	1x520= 520
7.Katana	0	0.0	0	0.0	0	0.0	0	0.0	-
8.Kelaniya	283	12.3	276	11.9	0	0.0	0	0.0	2x520=1040
9.Mahara	502	15.9	719	20.4	64	1.8	115	3.2	2x520=1040
10.Meerigama	894	29.3	1290	44.2	204	6.8	1372	46.2	4x520=2080
11.Minuwangoda	821	28.0	397	13.0	726	23.9	591	19.5	1x520=520
12.Negombo	602	21.9	203	7.5	2306	85.6	2375	88.2	6x520=3120
13.Ragama	0	0.0	0	0.0	0	0.0	58	4.5	1x520=520
14.Seeduwa	0	0.0	0	0.0	0	0.0	0	0.0	-
15.Wattala	196	6.9	144	4.9	180	6.1	376	12.8	2x520=1040
16.Mobile unit	1611	-	1133	-	2457	-	2236	-	-
Total District	7815	19.2%	5821	13.9%	8999	21.8%	11,498	27.8%	45x520=23,400

Oral screening coverage% for the year 2010, 2011, 2012 and 2013 were 19.2%, 13.9%, 21.8% and 27.8% respectively. Accordingly, the oral screening coverage% is increasing gradually in the district of Gampaha. The highest was in the year 2013 with a rate of 27.8%. It is important to note that registered number of pregnancies and the number of Dental Surgeons in the service were more or less static over the period of 2010 to 2013.According to the annual screening target of 520 mothers per Dental Surgeon, the screening coverage was not satisfactory in the district of Gampaha. In the year 2013, the highest coverage was reported in MOH area Negombo. The lowest coverage was noticed in MOH area Seeduwa, Katana and Kelaniya. In the year 2013, the screening coverage was not satisfactory in all MOH areas except the MOH areas Divulapitiya and Minuwangoda when compared with the annual target of screening given for the Dental surgeons providing care in each MOH area. Table 4 presents the treatment completion coverage of the district by MOH areas from the year 2010 to 2013.

Table 4: Distribution of Service Utilization (Treatment Completion Coverage %) by MOH areas in Gampaha District for the Years, 2010/ 2011/ 2012/ 2013

MOH area	Treatment completion coverage%							
	2010		2011		2012		2013	
	No.	%	No.	%	No.	%	No.	%
1.Attanagalla	60	1.9	65	1.9	24	0.7	67	**2.0**
2.Biyagama	77	2.2	77	2.0	43	1.3	38	**1.0**
3.Divulapitiya	301	12.3	186	7.1	645	25.2	1236	**48.3**
4.Dompe	63	2.3	65	2.3	330	12.9	196	**7.0**
5.Gampaha	66	2.1	68	2.1	74	2.4	164	**5.3**
6.Jaela	62	2.6	67	2.6	72	3.0	89	**3.8**
7.Katana	0	0.0	0	0.0	0	0.0	0	**0.0**
8.Kelaniya	126	5.5	124	5.3	0	0.0	0	**0.0**
9.Mahara	42	1.3	542	15.4	40	1.1	61	**1.7**
10.Meerigama	141	4.6	165	5.6	55	1.8	446	**15.0**
11.Minuwangoda	16	0.5	7	0.2	603	20.0	90	**3.0**
12.Negombo	83	3.0	68	2.5	203	7.5	185	**6.9**
13.Ragama	0	0.0	0	0.0	0	0.0	7	**0.5**
14.Seeduwa	0	0.0	0	0.0	0	0.0	0	**0.0**
15.Wattala	21	0.7	14	0.4	19	0.6	75	**2.6**
16.Mobile unit	102	-	641	-	74	-	61	-
Total district	**1160**	**2.8%**	**2089**	**5.0%**	**2401**	**5.8%**	**2715**	**6.6%**

Treatment completion coverage% for the year 2010, 2011, 2012 and 2013 were 2.8%, 5.0%, 5.8% and 6.6% respectively. An overall increase in the treatment completion coverage% was observed over the last four years. The treatment completion coverage% in Gampaha district was highest in the year 2013, with a rate of 6.6%. The highest coverage reported in the year 2013 was in MOH area Divulapitiya. It was found zero coverage in MOH area Seeduwa, Katana and Kelaniya.

Table 5 presents the overall service coverage of the district by MOH areas from the year 2010 to 2013.

Table 5: Distribution of Service Utilization (Overall Service Coverage %) by MOH areas in GampahaDistrict for the Years 2010/ 2011/ 2012/ 2013

MOH area	Overall Service Coverage%							
	2010		2011		2012		2013	
	No.	%	No.	%	No.	%	No.	%
1.Attanagalla	101	3.2	116	3.4	63	1.9	141	**4.2**
2.Biyagama	179	5.0	144	3.9	47	1.2	49	**1.3**
3.Divulapitiya	541	22.1	293	11.1	887	34.6	1540	**60.1**
4.Dompe	109	4.0	100	3.6	490	17.5	286	**10.2**
5.Gampaha	147	4.6	132	4.1	108	3.4	287	**9.2**
6.Jaela	98	4.1	83	3.3	150	6.3	199	**8.4**
7.Katana	0	0.0	0	0.0	0	0.0	0	**0.0**
8.Kelaniya	207	9.0	220	9.4	0	0.0	0	**0.0**
9.Mahara	143	4.5	622	17.6	67	1.9	87	**2.4**
10.Meerigama	344	11.3	367	12.6	163	5.4	670	**22.5**
11.Minuwangoda	87	3.0	76	2.5	668	22.0	240	**7.9**
12.Negombo	186	6.8	98	3.6	465	17.2	422	**15.6**

13.Ragama	0	0.0	0	0.0	0	0.0	26	**2.0**
14.Seeduwa	0	0.0	0	0.0	0	0.0	0	**0.0**
15.Wattala	72	2.5	26	0.9	55	1.8	131	**4.4**
16.Mobile Unit	343	-	834	-	1275	-	1015	-
Total	2557	6.3%	3111	7.4%	4657	11.2%	5093	12.3%

Note: Overall service coverage % = No. healthy + No. treatment completed

No. registered

There is a gradual increase in the overall service coverage% from the year 2010 to 2013.Coverage statistics was also reported using the data collected in the community survey among antenatal mothers.

Community survey among antenatal mothers

An interviewer administered questionnaire was given to 240 antenatal mothers attending antenatal clinics in their third trimester to assess the utilization of services and their oral healthcare knowledge, attitude and practices during pregnancy. The response rate among mothers was 100%.Distribution of age, ethnicity, and level of education of antenatal mothers is presented in Table 6. The risk category was defined as those aged 19 years or less and those aged 35 years and more. Ethnicity was categorized according to the four most common ethnicities in Sri Lanka.

Table 6: Distribution of Clients by Socio-demographic Characteristics

Variable	Frequency	
	No. (N=240)	%
Maternal age in years*		
<19	11	4.6
20-35	199	86.7
>36	21	8.7
Ethnicity		
Sinhala	222	92.5
Muslim	9	3.8
Tamil	7	2.9
Burghers &Other	2	0.8
Level of education		
Up to O/L	141	58.8
Above O/L	99	41.2
Monthly family income		
Less than Rs. 15,000	71	29.6
More than 15,000	169	70.4

*Median age=29yrs (IQR=25-32 yrs), Mean = 28.8 yrs (SD=5.1)

Thirteen percent of mothers (n=32) were in the risk category of pregnancy. Among the pregnant women 92.5% (n=222) were Sinhalese. The second majority were Muslims (n=9, 3.8%) and 2.9% of the group (n=70) were Tamils. More than half of the group (58.8%, n=141) had their education up to O/L class while 41.2% (n=99) had studied above O/L class. Only 29.6% of the group (n=71) had monthly family income of less than Rs.15, 000, while a majority of mothers had (70.4%, n=169) monthly income beyond Rs.15, 000.

Assessment of exposure to health education on oral health at the MCH clinic

The distribution of antenatal mothers according to the exposure to health education on oral health is shown in Table 7 and the person who provided the health talk shown in Table 8.

Table 7: Distribution of the Study sample by Exposure to Health Education on Oral Health at the MCH clinic

Received Health Education at MCH clinic	Frequency	
	No.	%
Yes	147	61.2
No	93	38.8
Total	240	100.0

About 61.2% of mothers (n=147) told that they were able to receive health education on "Importance of oral health care during pregnancy" at the antenatal clinic.

Table 8: Distribution of the Study sample by Person who provided Health Education on Oral health at the MCH clinic

Person who conducted Health Education at MCH clinic	Frequency	
	No. (N=147)	%
Medical Officer of Health	22	15.0
Dental Surgeon	28	19.1
Public Health Midwife	97	66.0
School Dental Therapist	7	4.8
Total	154*	104.9*

Note: Percentages sum to more than 100.0 because some women had received health education from more than one provider. Of the pregnant women interviewed, a majority of mothers (n=97, 66%) had received health education from the public health midwife. Approximately 19% (n=28) were able to get oral health information from a Dental Surgeon while 15% of them received health education (n=22) from the Medical Officer of Health. All the pregnant women were inquired about the exposure to referral services and the results are shown in Table 9.

Table 9: Distribution of the study sample by referral services at MCH clinic

Referral services at MCH clinic	Frequency	
	No.	%
Referred to a dental clinic	141	58.8
Not referred	99	41.2
Total	240	100.0

Among the pregnant women 58.8 % (n=141) were referred to the dental clinic. All the pregnant women were inquired about the exposure to 'oral screening' services and the type of dental clinic received the 'oral screening' during pregnancy. The results are presented in Table 10 & 11. The type of oral care received by the clients after the 'oral screening' is presented in Table 12.

Table 10: Distribution of the Study sample by Oral Screening at Dental clinic

Oral screening at Dental clinic	Frequency	
	No.	%
Yes	108	45.0
No	132	55.0
Total	240	100.0

Note: Besides two cases all other cases screened by a Dental Surgeon were documented in the Pregnancy record A. Among the pregnant women 45% (n=108) were screened by a Dental Surgeon. Thus, the total screening coverage% of the district was 45%.

Table 11: Distribution of the Study sample by' Type of Dental clinic that received the Oral Screening'

Type of dental clinic received oral screening	Frequency	
	No.(240)	%
Screened by Government services		
- **Government dental clinic**	72	**30.0**
- **Government mobile dental service**	11	**4.6**
Private dental clinic	25	**10.4**
Not screened	132	55.0
Total	**240**	**100.0**

Among the mothers interviewed, 30% (n=72) received care from institutional government dental clinics while 4.6% (n=11) received care from government mobile dental services. Altogether, around 34.6% were screened by government dental services while10.4% (n=25) of mothers received care from private dental clinics. Thus, the screening coverage% accounted by government and private dental facilities were 34.6% and 10.4% respectively.

Table 12: Distribution of the Study sample by 'Type of Oral Healthcare received at Dental clinic'

Type of care received at dental clinic	Frequency	
	No. (N=108)	%
Advice on oral care only	33	30.6
Restorative care	44	40.7
Surgical care (Extraction)	12	11.0
Full mouth scaling	10	9.3
Prescribe drugs	5	4.6
Specialized care	0	0.0
Giving Appointments only	8	7.4

Note: *Percentages sum to more than 100% because some women had received multiple dental treatments.

Among the pregnant women who attended to an oral screening a majority received restorative care (n=44, 40.7%). Only 11% (n=12) received surgical interventions while 9.3% (n=10) received full mouth scaling. None of the group was referred for specialized care. Among them, 7.4% (n=8) were sent back after giving appointments for the treatments. Final Oral Health Outcome of the mother after screening was based on the on-site oral health assessment conducted by the PI on each mother who had been subjected to oral screening. Treatment completion coverage% and overall service coverage% of the district were assessed using the examination findings and are presented in the Table 13.

Table 13: Distribution of the Study sample by 'Final Oral Health Outcome' of the mother

Final oral health outcome	Frequency	
	No.(N=240)	%
Among screened		
Healthy Mouth (Oral health is satisfactory)	33	13.7
Completed all necessary dental treatments	36	15.0
Need further care	39	16.3
Not screened	132	55.0
Total	**240**	**100.0**

Note: Treatment completion coverage % = $\frac{\text{No. treatment completed}}{\text{No. of registered mothers attended to MCH clinics}} = \frac{36}{240} = 15.0$

Overall service coverage % = $\frac{\text{No. healthy + No. treatment completed}}{\text{No. of registered mothers attended to MCH clinics}} = \frac{33+36}{240} = 28.7$

According to the pregnant mothers' survey, treatment completion coverage% and overall service coverage% of the district was 15.0% and 28.7% respectively. The total oral health care package delivered to each client included health education, timely referral, oral screening and recommended treatment. Table 14 shows the distribution of the mothers according to exposure to the total oral health care package of the programme.

Table 14: Distribution of the Study sample by Exposure to Total Oral Healthcare Package of the Programme (Health education at MCH clinic + Timely referral + Oral Screening and recommended treatments from a Dental clinic)

Exposure to 'Total oral healthcare package'	Frequency	
	No.(N=240)	%
Exposed		
- **Oral Health Education+ Referral+ Oral screening (found as healthy)**	33	**13.7**
- **Oral Health Education+ Referral+ Oral screening (treatment completed)**	36	**15.0**
- **Oral Health Education+ Referral+ Oral screening (treatment obtained & need further care after the delivery)**	35	**14.6**
Partially exposed		
- **Only to Health Education**	11	4.6
- **Only to referral**	5	2.1
- **Only to Health Education& referral**	32	13.3
- **Only to Oral examination**	4	1.7
Not exposed to any activity	84	35.0
Total	**240**	**100.0**

Among the pregnant women, 43.3% (n=104) were exposed to all the components of the 'Total oral healthcare package' consisted of oral health education, timely referral, oral screening and recommended treatment.

Discussion

Availability of services

The service availability statistics have shown the number of registered pregnant mothers per government Dental Surgeon was 916 in the district of Gampahain the year 2013. Based on the stipulated cut-off levels, the 'service availability' was satisfactory only in four MOH areas; Attanagalla, Dompe, Gampaha and Negombo. The service availability was 'zero' in MOH area Katana and Seeduwa where there were no government dental clinics (Table: 1).The service availability figures of the district were indicative of a marked disparity of the distribution of dental manpower and oral healthcare services within the district of Gampaha. The low dentist population ratio of the country given by 'six Dental Surgeons per 100,000 population' in the year 2012 further supported the gaps in service availability for antenatal mothers [21].In this situation, the re-organization of the services for pregnant mothers is very much needed. The necessity of re-distribution of the dental manpower and the equitable distribution of dental services was emphasized to prevent the overcrowding nature of some government dental clinics. In addition, the Mobile Dental Unit of the district could be deployed to any destination of the district depending on the needs and demands of the community. The recent recognition of the role of a Dental Surgeon in preventive oral care during pregnancy and early childhood was also emphasized and the decision to appoint one Dental Surgeon to each MOH area with outreach facilities would decide the future direction of maternal and child oral healthcare services of the country.

Accessibility to the services

It has shown, 80% of mothers had access to a private dental clinic within the distance of five kilometers while only 67.5% of mothers had access to a government dental clinic within that distance (Table:2). According to the National Oral Health Survey – 2002/ 2003 report, if more than 50% of respondents reported to be having a dental clinic within five kilometers it was considered as an evidence for accessibility of oral healthcare services [10] and the resulted two figures have shown both government and private dental services are accessible to the general public. The figure of physical accessibility was totally dependable on mothers' perceptions on distance of travel to the dental clinic. Inability of applying a more accurate method like Geographical mapping such as Geographical Information Systems (GIS) was due to the logistic and time constraints. Though the 'distance of travel' was beyond access, if the client can reach to the dental facility within a lesser time using modern transport, it may also affect the physical accessibility. It is a limitation where time taken to reach the closest facility was not inquired from the respondents. If the clinics are overcrowded the time taken to get the treatments would be the most appropriate measure. However, these figures may also vary with the mode of transport they used. Therefore, the 'closest distance to reach the clinic' was considered as the most valid measurement of physical accessibility for the present survey. During the community survey among pregnant mothers, it was observed that the 'referral rate' and the 'dental attendance' were relatively high in MCH clinics where there was a government dental facility nearby the MCH clinic (e.g.: Bemmulla clinic and Biyagama clinic). The high referral rate may be due to the strong liaison developed between the antenatal care providers and the Dental Surgeons. The dental attendance was high because it was convenient for the mothers to attend the dental clinic on the same day after seen by the medical doctor at MCH clinic. Therefore, another important measure of physical accessibility was emerged from the study. It was the closest distance from the MCH clinic to the government dental clinic which was not planned to assess during the present survey. According to the findings of the study, mothers can reach to a private dental facility more easily than a government dental facility and it has proven the growing number of private dental facilities in the district. Although the physical proximity to the private dental facilities was viewed as more satisfactory, the utilization pattern raised several concerns. The utilization of free of charge government dental facilities by antenatal mothers is higher (34.6%) than the private dental facilities (10.4%) (Table: 11). This may be attributed to the financial burden due to high cost incurred in private dental treatments. In Sri Lanka, health insurance payments for private dental care are also not much developed compared to other countries. Therefore, even if the private sector grows significantly, if the economic status of clients is not satisfactory to bear the out of pocket expenditure on dental care, the services will not be accepted by the mothers. This community survey was only focused on the physical accessibility in terms of physical proximity to the service provider. It would have been more completed if financial accessibility in terms of out of pocket cost for the visit including transport cost, provider's fee and additional cost on drugs/ investigations was inquired from each respondent. Further research should be encouraged to assess the financial accessibility to dental care.

Utilization of the services – oral screening and treatment provision

According to the evidence provided by the secondary data examined, the oral screening coverage of the district in 2013 was 27.8%. The treatment completion coverage and the overall service coverage was 6.6% and 12.3% respectively (Table: 3, 4, 5). It has shown the oral screening coverage was satisfactory only in MOH area Divulapitiya and Minuwangoda in the district of Gampaha. However, the accuracy of the secondary data may be affected by the timeliness and accuracy of returns provided by government Dental Surgeons and compiled at the regional office. The Annual report of the Family Health Bureau also stated the possible underestimation of the coverage figure observed through return data due to reluctance of Dental Surgeons in providing timely returns and inability to get the data from private dental clinics. The figures reported by them for the national screening coverage was 36% and 41% in the year 2012 and 2013 respectively[20, 21].Though the dental mobile provided its service to the entire district, the service statistics of the mobile was not compiled by MOH areas introducing an error to the given statistics of the district by MOH areas. Therefore, the interpretation of data should be done cautiously and immediate action should be taken to compile the statistics of Mobile Dental Unit according to MOH areas facilitating meaningful interpretation of the service coverage. At present the dental statistics of the pregnant mothers are not compiled by the Family Health Bureau using '512-A' pregnancy records, because it is recently introduced to the MCH information system. However, in the near future it would be possible to obtain more accurate figures of utilization of services including both

government and private dental facilities directly from the Quarterly MCH return (H509) where all MCH statistics and related dental statistics are available. Moreover, Roemar& Montoya-aguliar (1988) has stated, information systems are typically weak in developing countries and one must be cautious in drawing conclusions using these data [22]. Considering all possible weaknesses in the secondary data, the final conclusion was done based on the findings of the community survey among 240 antenatal mothers. These findings were considered as more valid and reliable since community surveys are always superior to the secondary data. It can also estimate both government and private dental utilization. However, the inherent limitation was the small sample size which was 240 in the present evaluation. According to this survey among 240 pregnant women attending MCH clinics, about 58.8 % (n=141) were referred to the dental clinic by the public health staff at MCH clinic (Table: 9).The oral screening coverage of the district was 45% (n=108). The screening coverage accounted by the government dental services was 34.6% (n=83) while it was 10.4% (n=25) in private dental services (Table: 11). Though, the programme was commenced in 2009, the screening coverage of the district accounted by the government dental services was only 34.6% in 2013 even after lapse of four years. The screening coverage of the district accounted by the government mobile dental service was limited only to 4.6% while remaining 30% was accounted by government hospital dental clinics, community dental clinics and adolescent school clinics (Table:11). Hence, the Mobile Dental Service also should be functioned to its maximum capacity to strengthen the oral healthcare services rendered to antenatal mothers. The present study has shown a higher figure of screening coverage (45%),in comparison with a previous study conducted by Wickramasinghe (2011)among 422 antenatal mothers in Dehiwala MOH area where it was 28% [23].One explanation behind the improved coverage in the present survey in 2013 could have been attributed to the improving acceptability of the programme by both clients and care providers after about two years. However, the private screening coverage was higher (17%) in Dehiwala, in contrast with the present findings where it was 10.4% and several concerns were raised. The study of Wickramasinghe (2011) was confined to a one particular MOH area which was an urban setting and most mothers may be working mothers and they may be financially more stable to afford private dental care. All the private dental practitioners work after hours and during weekends and it may be more convenient for them to attend private dentists than waiting long hours in government dental clinics. Moreover, the targeted mothers may be physically more accessible to the private dental clinics than the government clinics in that area. The private screening of the present study stands at a relatively lower level since it includes both rural and urban settings. The support obtained from the private dental clinics was also emerged as a great opportunity for the sustainability of the programme. Therefore ,it is a high time for the private dentists to take a more active role in oral health promotion of antenatal mothers. Collaborative efforts between Ministry of Health and the General Dental Practitioners Association are recommended to ensure delivery of a more accessible oral healthcare program for antenatal mothers in this country. In various research studies conducted in other countries have shown wide variation in 'oral screening coverage'. However, drawing conclusions depending on these data is unwise without comparing the service delivery structure of the different countries. Keirse & Plutzer (2010) reported, it was 27% in Greece and 33% to 64% in different regions of UK where dental care was free of charge to antenatal mothers as in Sri Lanka [24].These coverage statistics of oral screening suggest that the acceptance of prenatal dental care by both antenatal mothers and care providers is increasing gradually both locally and internationally. Results of the pregnant mother's survey indicate that the treatment completion coverage and the overall service coverage of the district were 15% and 28.7% respectively (Table: 13). These figures were more or less similar to the perceived treatment completion among antenatal mothers reported by Wickramasinghe in 2011 in Dehiwala MOH area where it was 14% [23].The resulted low figure for treatment completion coverage (15%) during the present evaluation could be due to poor compliance to treatments, delayed timing of the screening visit or certain resource and time limitations for treatment completion by the Dental Surgeons in the present context of service provision. If the screening visit was done timely preferably at the first ANC visit, there would be no undue delay in treatment completion. In addition there may be some other socio-cultural factors like myths and beliefs about dental treatments, behind the low coverage of treatment completion%. Therefore, comprehensive oral health promotion package consisted of oral health education, timely referral (at the first ANC visit), early screening, early treatment and timely follow-ups should be emphasized for all antenatal mothers. Meanwhile, all the mothers those who needed multiple dental treatments should be well-motivated for follow-up visits to complete the total oral care within the pregnancy. All Dental Surgeons should be trained to provide comprehensive dental care for all mothers

giving special attention to the few cases need prior medical attention. The present study revealed that among the pregnant women who attended for a dental check-up, 40.7% (n=44) received restorative care while 11% (n=12) had surgical interventions in terms of extractions. Among the remaining 9.3% (n=10) and 4.6% (n=5) of mothers had received full mouth scaling (FMS) and taken drugs respectively. None of the group was referred for specialized care. Among the mothers 7.4% (n=8) were sent back after giving an appointment for the treatment(Table: 12). Thus, the study has identified multiple types of dental treatments accepted and undergone safely by the antenatal mothers. The underlying reason behind the fewer number of dental extractions may be due to the development of advanced restorative techniques to save the teeth without straight away going for a dental extraction. It may also be associated with the dental fear and dental anxiety prevailing among mothers and not giving consent for surgical care because of the concerns in foetal safety. Periodontal care also limited may be due to lack of clinical time in overcrowded clinics to perform lengthy procedures like Full Mouth Scaling which will take minimum 20-30 minutes. About 7.4% were given appointments for after-care and the reasons attributed may be overcrowding nature of clinics. This is in contrast with the findings of a previous study conducted by Habashneh et al in 2005, where the predominant types of oral healthcare received were examination and routine scaling [25]. This is also in contrast with the study done by Wimalarathna (1997) evaluating the hospital dental services in Sri Lanka where the predominant type of dental treatment provided in government dental clinics were 'extractions of teeth' [26]. It should be interpreted carefully, because hospital dental services are targeted at the general public and not confined to antenatal mothers. This situation can be further explained by the recent recognition of modern dentistry in preserving a tooth by restorative and appropriate gum care and application of this new knowledge by practicing Dental Surgeons to minimize the dental extractions.Programme managers thus have to improve the screening and treatment completion coverage by taking remedial action to eliminate all the barriers which prevent the mothers from obtaining dental treatments during pregnancy as well as the providers from avoiding or delaying the appropriate care within pregnancy.

Utilization of services - Oral health education, timely referral

The present guidelines in Sri Lankan 'Pregnancy - oral healthcare package' recommends a dental referral in the first antenatal clinic visit, provision of oral health education at ANC, compulsory oral screening and completion of necessary clinical management for existing oral diseases before the time of delivery [17]. Among the pregnant women interviewed, 43.3% (n=104) were exposed to the total oral healthcare package consisted of four essential components of oral health education, timely referral, oral screening & obtaining recommended dental treatment (Table: 14). According to the results, 61.2% (n=147) of mothers received health education on 'oral healthcare in pregnancy' at the antenatal clinic and about 58.8 % of mothers (n=141) were referred to the dental clinic from the MCH clinic (Table: 7 & 9). The main service provider that majority of mothers obtained health education was the Public Health Midwife ((n=97, 66%). Approximately 19% (n=28) had received health education from Dental Surgeons while 15% of mothers (n=22) were able to get oral health information from the Medical Officer of Health. Only 4.8% (n=7) were addressed by the School Dental Therapist (Table: 8). The study conducted by Claas et al (2009) revealed, 14% of mothers obtained health education regarding oral health from dental care providers while 12.5% received oral health information from maternity care providers (27). Class et al (2009) further explained, that the 'access to oral health information' as a good indicator to assess the integration between oral health and antenatal care and considerable lacking of access to oral health information during pregnancy was emerged during his study conducted in 2009 among antenatal mothers in the Wellington region. In contrast with our findings, it has shown more than half of the 405 mothers interviewed (53.3%) had never received any information regarding oral care during pregnancy [27]. The poor access to oral health information was also appeared through Pregnancy Risk Assessment Monitoring System (PRAMs) data [14]. They have pointed out that oral health was not discussed with pregnant women as frequently as other prenatal health issues, such as breastfeeding, birth control, HIV testing, smoking and use of alcohol. It was reported that only 41% to 60% of women received oral health discussions while more than 75% exposed for other prenatal health topics[28, 29].Supporting this evidence Stevens et al (2007) stated, most of the time pregnant women with limited healthcare resources are presented with serious oral health issues during pregnancy and they have limited access to health information regarding the importance of preventive oral health practices during pregnancy and early child hood [30].According to the available literature, several

reasons appeared for the non-attendance to the dental clinic during pregnancy were 'not having any problem' or 'to delay treatments until after pregnancy'[25]. According to the study done by Wickramasinghe in 2011, the main reason pointed out for not receiving care was 'not urgent to attend'. It shows that failure to effectively communicate oral health messages to the pregnant woman can affect their oral healthcare seeking behavior during pregnancy [23].According to a study conducted by Boggess et al (2011) on knowledge and beliefs regarding oral health among 615 pregnant women, pointed out that 'oral health education' as a part of prenatal care can improve the knowledge on importance of oral health among vulnerable pregnant women [31]. A qualitative survey conducted by Buerlein et al (2011) among low income women in Maryland further explained that most women had not received oral health information in time to apply it according to the recommended practice as a shortcoming of prenatal oral health care [32].Thus, it is more appropriate if the grass root level health worker responsible for maternal health (PHM) can be actively involved in the timely referrals and basic oral health education of pregnant women and motivating them for oral screening and timely follow-ups. However, they should be supported by the oral healthcare personnel, especially the Dental Surgeons and School Dental Therapists during oral health education because they are the most technically sound personnel to conduct an oral health education session of good quality regarding oral healthcare during pregnancy and early childhood.

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References

1. Amini, H., &Casamassimo, P.S., (2010). Prenatal dental care: A review. General dentistry, Special PaediatricsSection.Retrieved from March 10, 2011, from www.agd.org.
2. (Buerlin et al, 2010).Buerlein, J., Peabody, H., Santaro, K. (2010). Improving access to perinatal oral health care: Strategies and considerations for health plans. National Institute for Health Care Management (NIHCM) Foundation, Issue brief July 2010. Retrieved September 2013, fromwww.NIHCM. ORG
3. Xiong, X., Buekens, P., Vastardis, S.& Yu SM. Periodontal diseases and pregnancy outcomes: State of the science. Obstetric and Gynaecological Survey, 2007;62 (9): 605-15.
4. Brown A. (2008).Access to Oral Health Care during the Perinatal Period: A PolicyBrief: National Maternal and Child Oral Health Resource Center, George University, Washington. Retrieved April 2013, from http://www.mchoralhealth.org.
5. California Dental Association (CDA) Foundation (2010). Oral Health During Pregnancy and Early Childhood:Evidence-Based Guidelines for Health Professionals.Retrieved March 21, 2012 from http://www.cdafoundation.org
6. Bercovitz, R.J. (2006). Mutans streptococci: Acquisition and transmission. Paediatric Dentistry.2006;28 (2):106-109.
7. Weintraub, J.A., Prakash, P., Shain, S.G., Laccabue, M., Gansky, S.A. (2010). Mothers' caries increases odds of children's caries. Journal of Dental Research, 2010; 89(9): 954-58.
8. Dye, B.A., Vargas, C.M., Lee, J.J., Magder, L., Tinanoff, N.Assessing the relationship between children's oral health status and that of their mothers. Journal of American Dental Association.2011; 142: 173-183.
9. Ramos-Gomez, F.J., Weintraub, J.A., Gansky, S.A., Hoover, C.I., Featherstone, J.D. Bacterial, behavioural and environmental factors associated with early childhood caries. The Journal of Clinical Paediatric Dentistry.2002;26: 165-173.
10. Ministry of health. (2009c). National oral health survey – 2002/2003. Colombo:Ministry of health.
11. Karunachandra, K.N.N. (2008). Oral healthcare needs among pregnant women in the Divulapitiya MOH area. MSc. Dissertation. Post Graduate Institute of Medicine, Colombo.
12. Ministry of Health. (2009b). Sri Lanka Demographic and Health Survey 2006/2007, Department of census and statistics. Colombo: Ministry of Health.
13. Shahim, F.N. (2003). Factors of risk to early childhood caries in a selected district in Sri Lanka. MD Thesis. Post Graduate Institute of Medicine, Colombo.
14. Gaffield, M.L., Gilbert, B.J., Malvitz, D.M., Romaguera, R. Oral health during pregnancy: An analysis of information collected by the Pregnancy Risk Assessment Monitoring System. Journal of the American Dental Association.2001; 132(7): 1009–16.
15. California Dental Association Foundation (2010), California Dental Association (CDA) Foundation (2010). Oral Health During Pregnancy and Early

Childhood: Evidence-Based Guidelines for Health Professionals. Retrieved March 21, 2012 from http://www.cdafoundation.org

16. National Maternal and Child Oral Health Resource Center. (2012). Oral healthcare during pregnancy: A National Consensus Statement – Summary of an expert work group committee meeting. Washington, DC: National Maternal and Child Oral Health Resource Center.

17. Ministry of Health. (2009a). Practice guidelines, Oral healthcare during pregnancy. Family Health Bureau.Colombo: Ministry of Health.

18. World Health Organization.(2013). Strategy for oral health in South-East Asia, 2013-2020. New Delhi: World Health Organization Regional Office for South-East Asia.

19. World Health Organization.(1981).Development of indicators for monitoring and progress towards health for all by the year 2000, Health for all, 4,25-63.

20. Ministry of Health.(2012). Annual report on family health Sri Lanka, Family Health Bureau. Colombo: Ministry of Health.

21. Ministry of Health, 2013). Annual report on family health Sri Lanka, Family Health Bureau. Colombo: Ministry of Health.

22. Roemer, M.I.& Montoya-aguliar, C. (1988). Quality assessment and assurance in primary healthcare. Geneva: World Health Organization.

23. Wickramasinghe D. (2011). Utilization pattern of oral healthcare services by mothers attending antenatal clinics in Dehiwala Medical Officer of Health area. MSc Dissertation. Postgraduate Institute of Medicine, Colombo.

24. Keirse M.J.N.C., Plutzer K. Women's attitudes to and perceptions of oral health and dental care during pregnancy. Journal of Perinatal Medicine.2010; 38:03-08.

25. Habashneh, R., Guthmiller, J.M., Levy, S., Johnson, G.K., Squier, C., Dawson, D.V.,Fang, Q. Factors related to utilization of dental services during pregnancy.Journal of Clinical Periodontology,2005; 32(7): 815–821.

26. Wimalaratne S.U. (1997). Evaluation of the hospital dental services using several alternative parameters. MD Thesis. Post Graduate Institute of Medicine, Colombo.

27. Class, B.M. (2009). Self-reported oral health and access to dental care among pregnant women in Wellington. (Master's thesis). University of Messay, Wellington, New Zealand.

28. Hwang, S.S., Smith, V.C., McCormick, M.C., Barfield, W.D.Racial/Ethnic disparities in maternal oral health experiences in 10 states, pregnancy risk assessment monitoring system, 2004-2006. Maternal Child Health Journal, 2011;15(6):722-9.

29. Junhie Oh, Leonard L, Fuller D, Miller K. (2011). Less than optimal oral health care during pregnancy in Rhode Island women: Oral health care as a part of prenatal care. Health By Numbers. 94(5):141-3. Retrieved fromhttp://www.rimed.org/medhealthri/2011-05/2011-05-141.pdf

30. Stevens, J., Iida, H., Ingersoll, G. Implementing an oral health programme in a group prenatal practice. Journal of Obstetric, Gynecological and Neonatal Nursing.2007;36(6): 581-591.

31. Boggess, K.A., Urlaub, D.M., Moors, M.K., Polinkovsky, M., El-Khorazaty, J., & Lorenz, C. Knowledge and beliefs regarding oral health among pregnant women. Journal of American Dental Association.2011; 142 (11):1275-1282.

32. Buerlein, J.K., Horowitz, A.M., & Child, W.L.Perspectives of Maryland women regarding oral health during pregnancy and early childhood. Journal of Public Health Dentistry, 2011; 71(2): 131-135.

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