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Views of pregnant women in South Western Sydney towards dental care and an oral-health program initiated by midwives

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Abstract

Issues addressed: Oral health during pregnancy is important, yet is often neglected by women. A program is currently being developed for midwives in Australia to promote maternal oral health. The aim of this study was to record the views of pregnant women in Australia towards dental care and midwives promoting oral health.

Methods: Using convenience sampling, a cross-sectional survey was undertaken of 241 pregnant women attending a metropolitan hospital in South Western Sydney in 2010.

Results: Only 10% of women received oral-health promotional material during pregnancy. More than 50% reported dental problems, yet only 17% had discussed this with their midwives and less than half (44.6%) had sought dental treatment. The main barriers to obtaining dental care were: lack of awareness, safety concerns about dental treatment and dental costs. Pregnant women were more likely ($P < 0.05$) to see a dentist if they had received information about oral health (odds ratio (OR) 3.25, 95% CI 1.34–7.90) and had private health insurance (OR 2.47, 95% CI 1.26–4.85). Most women (> 90%) were receptive to midwives providing oral-health education, assessments and referrals to affordable dental services.

Conclusion: This study has shown that pregnant women are receiving limited dental advice and are concerned about dental costs. It has also confirmed for the first time in Australia that women are very positive about receiving oral-health advice from midwives during their pregnancy.

So what? Oral-health promotion programs during pregnancy should consider using midwives to increase dental awareness among women and provide pathways to affordable dental services.

Key words: antenatal care, Australia, pregnancy.

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Introduction

Poor oral health during pregnancy is a growing public health problem. Due to hormonal variations, dietary changes and morning sickness, pregnant women are more susceptible to poor oral health than the general population.[1] This, in turn, can impact both pregnancy and infant outcomes. Current evidence indicates that having severe gum disease during pregnancy may contribute to low birthweight and premature births.[2,3] Furthermore, women who have dental decay during and after pregnancy can pass on decay-causing bacteria to their children through inappropriate feeding practices.[4–6] This can lead to early childhood caries, which is the single most common chronic childhood disease affecting infants and preschool children worldwide.[7]

Unfortunately, pregnant women seldom consult a dentist during pregnancy, even when a dental problem exists. Studies show that dental utilisation rates among pregnant women are consistently low worldwide, ranging from 30 to 49%,[8–10] with the main barriers to seeking dental care being cost and lack of awareness.[8,11] Two strategies have been advocated to try to improve the uptake of dental services among pregnant women, one of which has been the

provision of affordable dental care. This is evident in the UK where pregnant women are provided exemption certificates that entitle them to free access to the public dental services[12] both during pregnancy and for 12 months postnatally. Unfortunately, despite these attempts, the uptake of dental services remains relatively low in the UK.[8] Another strategy has been to utilise antenatal care providers to improve oral-health awareness among pregnant women by providing oral-health education, assessments and referrals during pregnancy.[7] In the USA various maternity programs have incorporated such an approach into their antenatal practices.[13,14] Oral-health-care promotion during pregnancy has been shown to have a positive effect on the oral health of infants and children.[15]

However, in Australia no preventative strategies have been put in place to promote oral health among pregnant women.[11] Currently, there is limited access to free public dental services and private dental treatment is unaffordable for many Australian families.[16] To address this issue, the study investigators are developing a preventative oral-health program for families in South Western Sydney that encompasses both the UK and USA approaches. South Western Sydney was chosen because of the numerous disadvantaged communities in the area.[17] The proposed program involves midwives providing oral-health education, assessment and referrals (to prompt and affordable public dental services) for pregnant women at their first antenatal visit. As part of the program development process, the investigators are gathering supporting data for the program. To date our research has indicated a lack of oral-health awareness among pregnant women in South Western Sydney[18] and the need for further education for midwives in oral health.[19] Aspects of this study sample that have been reported elsewhere[20] have shown a high prevalance of dental problems among pregnant women in South Western Sydney and their lack of knowledge about the impact of poor maternal oral health. This paper further reports on the acceptibility and feasibility of the proposed program for pregnant women.

The aim of this study was to record the views of pregnant women in South Western Sydney towards dental care and midwives promoting oral health. The research questions included:

- What information have pregnant women received about oral health during pregnancy?
- What is the uptake of dental services among pregnant women in South Western Sydney?
- What are the perceptions of pregnant women towards midwives providing oral-health education, assessments and referrals to affordable dental services?
- What are the factors that could influence pregnant women to participate in an oral-health program initiated by midwives?

Method

Sample and setting

A cross-sectional survey was undertaken of pregnant women attending the antenatal care clinic in a large metropolitan hospital in South Western Sydney, New South Wales, in 2010. Using convenience sampling, 314 pregnant women were invited by a research assistant to complete the questionnaire.

Data collection

The survey administered was structured and contained items relating to different aspects of oral-health care during pregnancy. Only items relating to the focus of this study are reported here and include the following: awareness about maternal oral health; existing oral-health problems; frequency of dental visits; barriers to dental care; and perceptions of an oral-health program initiated by midwives. Findings from the other survey items have been reported elsewhere.[20] Sociodemographic details such as age, period of gestation, education, employment and household income, were also collected. Many of the survey items were selected from large national and international oral-health surveys.[21–23] Participants were recruited over a 5-month period and were asked to complete a 15-min questionnaire. All women in the antenatal clinic, regardless of whether they participated, were provided with oral hygiene products and information about improving their oral health.

Data analysis

Survey data were entered into SPSS[24] and analysed. Descriptive statistics were calculated and tabulated for categorical (frequency and percentage) and continuous (mean and standard deviation) variables. Inferential statistics such as the Chi-square test was used to compare the profiles of pregnant women who had seen a dentist in the last 6 months with those who did not (significance level $P < 0.05$). Factors associated with the pregnant women's visit to a dentist in the last 6 months were explored using univariate and multivariate logistic regression. Factors showing association with the dental visit ($P \leq 0.2$) in univariate analysis were considered as potential variables for the initial multivariate model. Variables were eliminated one at a time if they were not significant and their removal did not largely affect the coefficients of the other factors in the model until all remaining variables were significant. The final model was assessed for fitness using the Hosmer–Lemeshow goodness-of-fit test. A significance level of $P < 0.05$ was used throughout the regression analysis.

Ethics approval

Ethical approval was provided by the South Western Sydney Local Health District Human Research Ethics Committee. Participation was voluntary and privacy and confidentiality of all study information was maintained.

Results

Demographic characteristics

Two hundred and forty-one pregnant women completed the survey, giving a 77% response rate. The mean age of the participants was 28.1 years (s.d. $\pm$ 5.6). The demographic characteristics of the participants described in Table 1 are fairly representative of South Western Sydney, with population data for the area showing that

Table 1. Sociodemographics of participants ($n = 241$)

Characteristic	Frequency (%)
Country of origin	
Australia	179 (74.3)
Overseas	62 (25.7)
Gestation period[A]	
1st trimester	7 (2.9)
2nd trimester	80 (33.6)
3rd trimester	151 (63.5)
Maternal age (years)[A]	
Under 25	64 (27.3)
25–35	145 (62.0)
Over 35	27 (10.7)
Combined annual household income[A]	
<$40 000	49 (20.6)
$40 000–$80 000	77 (32.4)
>$80 000	63 (26.5)
Don't know	36 (15.0)
Refused	13 (5.5)
Employment	
Working	101 (43.2)
Not working	133 (56.8)
Highest education qualification[A]	
Year 12 or less	111(46.1)
Vocational education (TAFE)	74 (30.7)
University	53 (22.0)
Health Care Card holder[A]	
Yes	84 (35.4)
No	153 (64.6)
Access to private health insurance[A]	
Yes	47 (19.7)
No	191 (80.3)

[A]Missing data (range 3–7).

26.2% are born overseas[25] (25.7%, 95% CI 20.2–31.2 in the study sample) and 53.1% have no formal qualifications (beyond secondary school)[25] (46.1%, 95% CI 39.8–52.4 in the study sample).

Views towards dental care during pregnancy

Only 10% of women reported receiving any oral-health care information during their pregnancy (Table 2), with the main sources being brochures (87.5%), antenatal care providers (29.2%) and dentists (12.5%).

Only 17% of the women reported their oral-health problems to the midwives, mainly because they felt it was not important and it was not asked during their antenatal visit. The uptake of dental services was low (44.6% ($n = 58$)) among women who reported an oral-health problem, with the main barriers being concerns about the safety of dental treatment during pregnancy, cost of dental treatment and time constraints.

Comparison of the profiles of participants who had consulted and not consulted a dentist in the last 6 months showed a significant difference ($P < 0.05$) in the amount of information about oral health that was received during pregnancy ($P = 0.015$), household income ($P = 0.002$) and access to private health insurance ($P = 0.002$).

Table 3 shows the results of univariate logistic regression of potential factors associated with dental visits in the last 6 months. Significant associations were found between dental visits and oral-health information received during pregnancy (odds ratio (OR) 3.70, 95% CI 1.56–8.79, $P = 0.003$) and access to private health insurance (OR 2.74, 95% CI 1.42–5.29, $P = 0.003$). No significant association was found between dental visits and other variables.

The final multivariate logistic regression showed that pregnant women were more likely to see a dentist in the last 6 months if they received oral-health information during pregnancy (OR = 3.25, 95% CI 1.34–7.90, $P = 0.009$) and had access to private health insurance (OR = 2.47, 95% CI 1.26–4.85, $P = 0.009$) (Table 4). The resulting model was a good fit (Hosmer–Lemeshow goodness-of-fit test, not significant ($P = 0.834$, d.f. = 1)).

Views about midwives promoting oral health

More than two-thirds of the pregnant women (70.6%, $n = 168$) felt that midwives could assist in identifying dental problems and would seriously consider their dental advice (87.4%, $n = 208$). The pregnant women were also very likely to participate in an oral-health-service program where midwives would ask dental questions (95%, $n = 226$), offer dental advice (92%, $n = 92$) and undertake a visual dental inspection (92.9%, $n = 221$). In addition, the offer of free dental treatment by public dentists was seen as a positive initiative by most (96.6%) participants. The majority of pregnant women (>50%) who were receptive to the proposed service were from low to middle income families (<$80 000 per year).

There were valuable suggestions about how an oral-health program should be structured. More than half of the women (53.2%, $n = 126$) felt the first antenatal visit was the most appropriate time for midwives to give dental advice. If free dental care was to be provided, the majority wanted the participating public clinics to be located close to their home (71%, $n = 171$) or at the maternity hospital 39.8%, $n = 96$) and accessible on weekdays during school hours (52%, $n = 126$).

Discussion

The findings confirm earlier qualitative research[18] about the potential value of implementing an oral-health program to improve oral health among pregnant women in South Western Sydney. Improving maternal oral health is clearly a public health issue as evidenced by the prevalence of dental problems among pregnant women in the area and the limited uptake of dental services. These rates of dental problems are reported to be higher than population data for similar aged women in the state.[20] Similar findings from other studies[26,27] confirm that poor oral health amongst pregnant women is a particular issue for socioeconomically disadvantaged communities.

The findings also corroborate earlier suggestions[18] about the main issues that need to be addressed to promote maternal oral health. Pregnant women in this study were more likely to see a dentist if

Table 2. Aspects of dental care reported by pregnant women ($n = 241$)

Variable	Frequency (%)
Did you receive oral health information during pregnancy	
Yes	24 (10.0)
No	217 (90.0)
Did you have a dental problem?	
Yes	130 (53.9)
No	111 (46.1)
Did you inform midwives about your dental problem ($n = 130$)[A]	
Yes	22 (17.1)
No	107 (82.9)
Reasons for not informing a midwife ($n = 107$)[B]	
Didn't think it was important	70 (65.4)
Not asked during the antenatal visit	32 (29.9)
Self conscious about my oral health	5 (4.7)
Didn't think it was the midwife's role	3 (2.8)
Have you consulted a dentist for your dental problem ($n = 130$)	
Yes	58 (44.6)
No	72 (55.4)
Reasons for not consulting a dentist ($n = 72$)[B]	
Safety concerns about dental treatment during pregnancy	23 (31.9)
High cost of dental treatment	21 (29.2)
No time to see a dentist	21 (29.2)
Oral health is not a priority	15 (20.8)
Advised by prenatal care providers not to seek dental treatment	3 (4.2)
Have you seen a dentist in the last 6 months?[A]	
Yes	73 (30.5)
No	166 (69.5)

[A]Missing data (range 1–2).
[B]Multiple responses.

they had private health insurance, which suggests that for any preventative program to be successful pregnant women need to be able to access timely and affordable dental care. However, studies have shown that this is lacking in Australia.[20,26] Recent estimates indicate that ~400 000 Australians are on the waiting list for public dental services, with some people waiting almost 2 years to receive dental care.[28] As a consequence, less than 10% of the population who are eligible are able to access public dental services.[16] The situation is no better in the private sector, with the average cost of the dental treatment being beyond the reach of many Australian families, especially those who have no private dental insurance.[16]

The evidence from international studies[8,29] suggests that addressing dental costs may not be the only strategy to improving uptake of dental services during pregnancy. Our study showed that very few pregnant women in South Western Sydney are receiving adequate information about the importance of oral-health care during pregnancy and as a result had safety concerns about dental treatment and did not consider an oral-health check a priority, even when they had dental problems. These finding support earlier research[8,13,26,30] in highlighting the need for preventative strategies to improve oral-health awareness among pregnant women and dispel any misconceptions they may have about dental treatment during pregnancy.

Another issue that is evident in this study is the limited role of antenatal care providers in Australia in promoting oral health. It is clear that antenatal care providers need to play a more active role in promoting oral health as highlighted by international guidelines.[7] However, preliminary research involving Australian midwives[19] has shown that they require further education and training before they can take up this role. This is especially important considering oral health is not addressed in current midwifery practice and no education in this area is provided during university training.[11]

Valuable information has also been provided for the first time in Australia to help inform an oral-health program for pregnant women in South Western Sydney. More than half of the women felt their first antenatal visit was the ideal period to promote oral health. This suggestion is supported by current international guidelines,[7,31] which advocate the first antenatal appointment as the most appropriate time to raise oral-health awareness. Similar views have been reiterated in the new National Antenatal Care guidelines recently released in Australia.[32] Many pregnant women also highlighted the need for dental services to be provided during school hours and close to their home or hospital. This is again supported by the literature as transportation is a frequently cited barrier for pregnant women who are socioeconomically disadvantaged seeking dental care.[33]

This research, together with other international evidence, certainly supports a midwifery-initiated oral-health program as a way of promoting maternal dental care. The program incorporates oral-health guidelines into current midwifery practice and provides

Table 3. Potential factors associated with dental visits in the last 6 months by simple logistic regressions

Variable	Crude odds ratio	95% CI	*P*-value
Country of origin			
Australia	1.67	0.85–3.26	0.14
Overseas	1		
Gestation period			
1st trimester	2.86	0.62–13.3	0.17[A]
2nd trimester	0.69	0.37–1.29	0.18
3rd Trimester	1		0.24
Maternal age (years)			
<25	1	0.39–1.37	0.37[A]
25–35	0.73	0.18–1.41	0.33
>35	0.50		0.19
Combined annual household income			
<$40 000	1	0.24–1.19	0.09[A]
$40 000–$79 999	0.54	0.53–2.53	0.13
>$80 000 versus <$40 000	1.16		0.71
Highest education qualification			
No qualifications	1	0.92–3.32	0.20[A]
Vocational college	1.75	0.76–3.20	0.09
University	1.56		0.22
Health Care Card holder			
Yes	0.81	0.45–1.45	0.47
No	1		
Access to private health insurance			
Yes	2.74	1.42–5.29	0.003
No	1		
Employment			
Working	1.06	0.60–1.85	0.85
Not working	1		
Did you receive oral health information during pregnancy			
Yes	3.70	1.56–8.79	0.003
No	1		
Did you have a dental problem?			
Yes	1.02	0.59–1.78	0.93
No	1		
Did you inform midwives about your dental problem			
Yes	2.14	0.84–5.47	0.11
No	1		

[A]Represents the overall *P*-values for the variable.

Table 4. Factors associated with dental visits in the last 6 months by multiple logistic regression analysis

Variables	Adjusted odds ratio	95% CI	*P*-value
Access to private health insurance			
Yes	2.47	1.26–4.85	0.009
No	1		
Did you receive oral health information during pregnancy			
Yes	3.25	1.34–7.90	0.009
No	1		

intensive education and training through an online education program on how to provide oral-health education, assessments and referrals to pregnant women at the first antenatal visit.[34] Preliminary qualitative research had suggested that such a scheme would be acceptable to pregnant women.[18] The findings from this study confirm this, with an overwhelming number of women (>90%) showing strong support for the program and willingness to participate in the various aspects of the model including having midwives visually inspect their teeth – something that has never been undertaken in midwifery care. The findings also suggest that the proposed scheme would most likely be taken up by pregnant women from low to middle income families, which is encouraging as this population has been shown to have a prevalence of dental problems.[20] This is the first time that it has been demonstrated in Australia that the majority of pregnant women are receptive to the idea of midwives promoting oral health.

Finally, it is important to mention that developing a preventative oral-health program may only be part of the solution to improving oral health among pregnant women. A recent review has highlighted the lack of consensus among antenatal care providers and dentists regarding perinatal oral health, resulting in conflicting messages being provided to pregnant women about dental care.[35] Studies show that dentists are sometimes hesitant in treating pregnant women,[36,37] while many medical practitioners believe dental procedures are unsafe during pregnancy.[38] In contrast, obstetricians and gynaecologists acknowledge the importance of maternal oral health and are supportive of dental treatment during pregnancy.[37,39] This confusion can further deter pregnant women from seeing a dentist and was evident in our findings as a small proportion of the women avoided dental care as they were advised against it by their antenatal care providers. It was for this reason that new evidence-based guidelines on perinatal oral health were developed internationally[7] to ensure women receive a consistent message about oral-health care during pregnancy. Unfortunately, no such guidelines exist in Australia[35] and this is an area that needs further development to complement any preventative oral-health strategies for pregnant women.

Strengths and limitations

As this study only includes the views of individuals attending one hospital maternity unit, it does not provide data on the opinions of the general population of pregnant women. Nevertheless, this type of information is difficult to collect and the findings are supported by our qualitative data and international research. In addition, the maternity unit is situated in a disadvantaged area of Sydney and is by its very nature a relevant example of the issues faced by many women who have a limited disposable income to purchase private dental care and advice. Therefore, despite the sampling frame restriction, the findings are robust and offer for the first time useful information that can be used to plan a preventative program to improve the oral health of pregnant women in Australia using midwives. In addition, involving and empowering midwives to undertake an active role in oral-health promotion will help integrate oral health with general health check during pregnancy.

Conclusion

This study has confirmed the need for an oral-health program to improve maternal oral health in South Western Sydney. It is clear that pregnant women in the area have limited awareness about the importance of maternal oral health and have difficulty accessing affordable dental care. The findings also overwhelmingly show that utilising midwives to promote oral health is a feasible and acceptable solution for pregnant women. Although these findings are based on a convenience sample and may not be representative of the population, they are consistent with earlier research in the area.[18] Future strategies to promote maternal oral health should utilise antenatal care providers to improve dental awareness and ensure dental care is accessible and affordable for pregnant women, especially in disadvantaged families. Programs that adopt such strategies, like the midwifery-initiated oral-health program, could increase the uptake of dental services among pregnant women and improve their oral-health status.

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References

1. Silk H, Douglass AB, Douglass JM, Silk L. Oral health during pregnancy. *Am Fam Physician* 2008; **77**: 1139–44.
2. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. *BJOG* 2006; **113**: 135–43. doi:10.1111/j.1471-0528.2005.00827.x
3. Shub A, Wong C, Jennings B, Swain JR, Newnham JP. Maternal periodontal disease and perinatal mortality. *Aust N Z J Obstet Gynaecol* 2009; **49**: 130–6. doi:10.1111/j.1479-828X.2009.00953.x
4. American Academy of Pediatric Dentistry Guideline on perinatal oral health care. 2011. Available from: http://www.aapd.org/media/Policies_Guidelines/G_PerinatalOralHealthCare.pdf [Verified 1 October 2011].
5. Gussy MG, Waters EG, Walsh O, Kilpatrick NM. Early childhood caries: current evidence for aetiology and prevention. *J Paediatr Child Health* 2006; **42**: 37–43. doi:10.1111/j.1440-1754.2006.00777.x
6. Yost J, Li Y. Promoting oral health from birth through childhood: prevention of early childhood caries. *MCN Am J Matern Child Nurs* 2008; **33**(1): 17–23. doi:10.1097/01.NMC.0000305652.01743.8d
7. California Dental Association Foundation, American College of Obstetricians and Gynecologists, District IX. Oral health during pregnancy and early childhood: evidence-based guidelines for health professionals. *J Calif Dent Assoc* 2010; **38**: 391–440.
8. Keirse MJNC, Plutzer K. Women's attitude to and perceptions of oral health and dental care during pregnancy. *J Perinat Med* 2010; **38**: 3–8. doi:10.1515/jpm.2010.007
9. Gaffield ML, Colley-Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy. An analysis of information collected by the Pregnancy Risk Assessment Monitoring System. *J Am Dent Assoc* 2001; **132**: 1009–16.
10. Hullah E, Turok Y, Nauta M, Yoong W. Self-reported oral hygiene habits, dental attendance and attitudes to dentistry during pregnancy in a sample of immigrant women in North London. *Arch Gynecol Obstet* 2008; **277**: 405–9. doi:10.1007/s00404-007-0480-8
11. George A, Johnson M, Blinkhorn A, Ellis S, Bhole S, Ajwani S. Promoting oral health during pregnancy: current evidence and implications for Australian midwives. *J Clin Nurs* 2010; **19**: 3324–33. doi:10.1111/j.1365-2702.2010.03426.x
12. National Health Service. What are my rights during pregnancy? 2008. Available from: http://www.nhs.uk/chq/pages/941.aspx [Verified 15 April 2009].
13. Stevens J, Iida H, Ingersoll G. Implementing an oral health program in a group prenatal practice. *J Obstet Gynecol Neonatal Nurs* 2007; **36**: 581–91. doi:10.1111/j.1552-6909.2007.00189.x
14. Carl LD, Roux G, Matacale R. Exploring dental hygiene and perinatal outcomes. *AWHONN lifelines* 2000; **4**(1): 22–7.
15. Meyer K, Geurtsen W, Gunay H. An early oral health care program starting during pregnancy: results of a prospective clinical long-term study. *Clin Oral Investig* 2010; **14**: 257–64. doi:10.1007/s00784-009-0297-x
16. New South Wales Parliament. Dental services in NSW: Report by standing committee on social issues. 2006. Available from: http://www.parliament.nsw.gov.au/Prod/parlment/committee.nsf/0/4fa2d0149b588095ca25714200077d20/$FILE/FINAL-%20COMPILED%2030%20MARCH.pdf [Verified 8 September 2008].
17. Sydney South West Area Health Service. Annual Report 2006/07. 2008. Available from: http://www.slhd.nsw.gov.au/ARarchive/Statutory_Annual_Report_06-07.pdf [Verified 8 September 2008].
18. George A, Johnson M, Duff M, Ajwani S, Bhole S, Blinkhorn A, *et al*. Midwives and oral health care during pregnancy: perceptions of pregnant women in South-Western Sydney, Australia. *J Clin Nurs* 2012; **21**: 1087–96. doi:10.1111/j.1365-2702.2011.03870.x

19. George A, Johnson M, Duff M, Blinkhorn A, Ajwani S, Bhole S, *et al*. Maintaining oral health during pregnancy: perceptions of midwives in Southwest Sydney. *Collegian* 2011; **18**: 71–9. doi:10.1016/j.colegn.2010.10.003
20. George A, Johnson M, Blinkhorn A, Ajwani S, Bhole S, Yeo AE, *et al*. The oral health status, practices and knowledge of pregnant women in South-western Sydney. *Aust Dent J* 2013; **58**(1): 26–33. doi:10.1111/adj.12024
21. Carter KD, Stewart JF. National dental telephone interview survey 1999. Adelaide: AIHW Dental Statistics and Research Unit; 2002. AIHW cat. no. DEN 109.
22. California Department of Public Health. Maternal and Infant Health Assessment (MIHA) survey. 2010. Available from: http://www.cdph.ca.gov/data/surveys/Pages/MaternalandInfantHealthAssessment(MIHA)survey.aspx [Verified 12 October 2011].
23. Department of Health. The NHS Oral Health Assessment Final report. 2006. Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4134370 [Verified 12 October 2011].
24. SPSS Inc. PASW Statistics for Windows, Version 18.0.. Chicago: SPSS Inc.; 2009.
25. Campbelltown City Council. Community Profile. 2011. Available from: http://profile.id.com.au/Default.aspx?id=208&pg=2&gid=10&type=enum [Verified 11 October 2011].
26. Thomas NJ, Middleton PF, Crowther CA. Oral and health care practice in pregnant women in Australia: a postnatal survey. *BMC Pregnancy Childbirth* 2008; **8**: 13–20. doi:10.1186/1471-2393-8-13
27. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. *BJOG* 2006; **113**: 135–43. doi:10.1111/j.1471-0528.2005.00827.x
28. Department of Health and Ageing. Dental Health: Final Report of National Advisory Council on Dental Health. 2012. Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/final-report-of-national-advisory-council-on-dental-health.htm [Verified 12 September 2012].
29. Al-Habashneh R, Guthmiller JM, Levy S, Johnson GK, Squier C, Dawson DV, *et al*. Factors related to utilization of dental services during pregnancy. *J Clin Periodontol* 2005; **32**: 815–21. doi:10.1111/j.1600-051X.2005.00739.x
30. Saddki N, Yusoff A, Hwang YL. Factors associated with dental visit and barriers to utilisation of oral health care services in a sample of antenatal mothers in Hospitak University Sains Malaysia. *BMC Public Health* 2010; **10**: 75. doi:10.1186/1471-2458-10-75
31. National Maternal and Child Oral Health Resource Center. Oral health Care during pregnancy: A summary of practice guidelines. 2008. Available from: http://www.cdph.ca.gov/HealthInfo/healthyliving/childfamily/Documents/MO-OHP-SummaryPracticeGuidelines9-08.pdf [Verified 2 April 2009].
32. Australian Health Ministers' Advisory Council. Clinical Practice Guidelines: Antenatal Care – Module 1. Canberra: Australian Government Department of Health and Ageing; 2012. Available from: http://www.health.gov.au/antenatal [Verified 6 April 2013].
33. Stewart DCL, Ortega AN, Dausey D, Rosenheck R. Oral health and use of dental services among Hispanics. *J Public Health Dent* 2002; **62**(2): 84–91. doi:10.1111/j.1752-7325.2002.tb03427.x
34. Centre for Applied Nursing Research. MIOH online education program. 2012. Available from: https://www.sswahs.nsw.gov.au/sswahs/canr/training/ [Verified 6 April 2013].
35. George A, Shamim S, Johnson M, Dahlen H, Ajwani S, Bhole S, *et al*. Perceptions of dental and prenatal care practitioners towards dental care during pregnancy: current evidence and implications. *Birth* 2012; **39**(3): 238–47.
36. Zanata RL, Fernandes KB, Navarro PS. Prenatal dental care: evaluation of professional knowledge of obstetricians and dentists in the cities of Londrina/PR and Bauru/SP, Brazil, 2004. *J Appl Oral Sci* 2008; **16**(3): 194–200. doi:10.1590/S1678-77572008000300006
37. Strafford KE, Shellhaas C, Hade EM. Provider and patient perceptions about dental care during pregnancy. *J Matern Fetal Neonatal Med* 2008; **21**(1): 63–71. doi:10.1080/14767050701796681
38. Al-Habashneh R, Aljundi SH, Alwaeli HA. Survey of medical doctors' attitudes and knowledge of the association between oral health and pregnancy outcomes. *Int J Dent Hyg* 2008; **6**(3): 214–20. doi:10.1111/j.1601-5037.2008.00320.x
39. Morgan MA, Crall J, Goldenberg RL, Schulkin J. Oral health during pregnancy. *J Matern Fetal Neonatal Med* 2009; **22**(9): 733–9. doi:10.3109/14767050902926954